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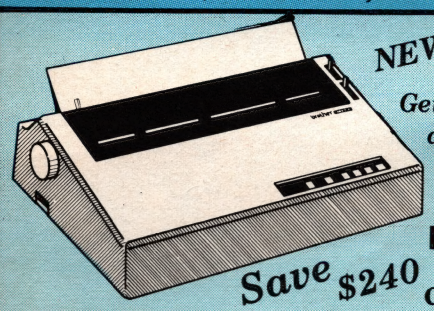

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NEW

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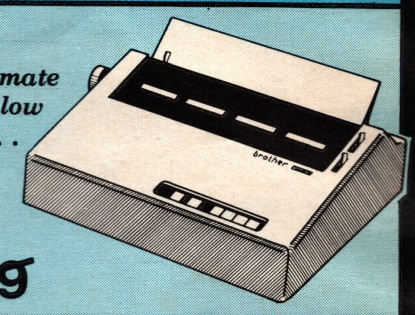

Save $270 off list JUST ~~$239~~

The NEW **brother** HR-10 gives you superb quality and advanced technology from the company that has long years of experience in electronic office machines. The HR-10 is not only a high quality unit but a printer that will last with a snappy 120 word per minute print speed. It uses the renowned **brother** cassette daisywheels for ease in changing and the **brother** mess-less ribbon cassettes. And with the text reprinting feature you can set the HR-10 to continuously print out whatever is stored in the 2k memory buffer — all this at the touch of the front panel control. Control codes emulate Diablo 630 codes for universal compatibility with most software. Other standard, time-saving features include super and sub scripting, automatic underlining, and bold printing giving your printout a professional quality cleanliness. The HR-10 is capable of printing most 4 part forms and accepts a paper width up to 11½ inches. This new addition to the **brother** HR series represents an outstanding value for a personal daisywheel printer.

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For the high output office get the. . .

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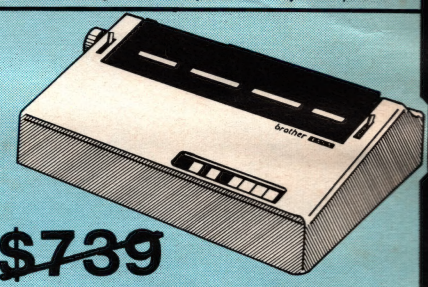

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One of the main concerns in a high output office is putting out the work required without concern. **brother's** HR-35 will not only print out whatever is on your word processor's mind with the finest daisywheel beauty, but will print it out with a speed (32 cps) and accuracy that will keep your work moving in the right direction. Because the HR-35 incorporates a big 7k (23k optional) buffer memory, your computer will be free for other operations almost as soon as you give it the print command. And that buffer won't stay full for long, thanks to HR-35's 32 character per second print speed and bi-directional logic seeking carriage movement. But the HR-35 does not give up efficiency for speed. Since the printer head comes to a full stop at each strike zone, the high quality of the daisy wheel is taken full advantage of. HR-35 presents you with a host of other welcome features such as two color and bold printing, just the thing to make your text stand out. Extras include super and sub script function, auto underlining, proportional spacing, text reprinting, clear buffer and easy to use front panel control for all the main operations. HR-35's back panel allows either centronics parallel or RS-232C serial interface connection. DIP switches are easy to access and attachable options such as the tractor feeder and cut sheet feeder offer increased utility. And it goes without saying that the HR-35 uses exclusive **brother** daisywheel cassettes and ribbon cassette systems for simpler, mess-less changes. **brother** HR-35, a high output printer.

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The M-1509 also incorporates a number of cost- and labor-saving features. The large memory buffer releases the computer for other tasks while printing, an optional cut sheet feeder reduces paper-handling time, and the one-inch paper cut function economizes on paper. In addition, the M-1509 is supplied with character sets and control codes compatible with those of the IBM PC and the Epson FX series printers, for easy interfacing with a broad range of computer equipment.

Above all, the M-1509 is designed for people. It is exceptionally slim and light, with conveniently consolidated controls, allowing it to fit easily into a fully-equipped work station without wasting either office space or valuable operator time. It is also quiet – a fact which, though often overlooked, is of crucial importance in maintaining an efficient, industrious office environment.

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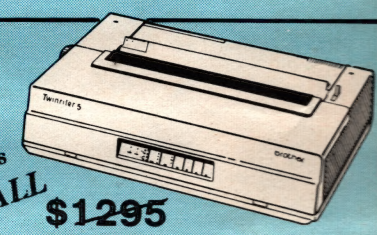

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Now you can have 36 cps letter quality printouts for word processing requirements and 140 cps dot matrix speed for data processing or first drafts, without having to buy two separate printers. And that's not all. The **Twinwriter 5** is designed to be compatible with the new requirements of most integrated software systems. This means that it fits right into a comprehensive office system without special programming.

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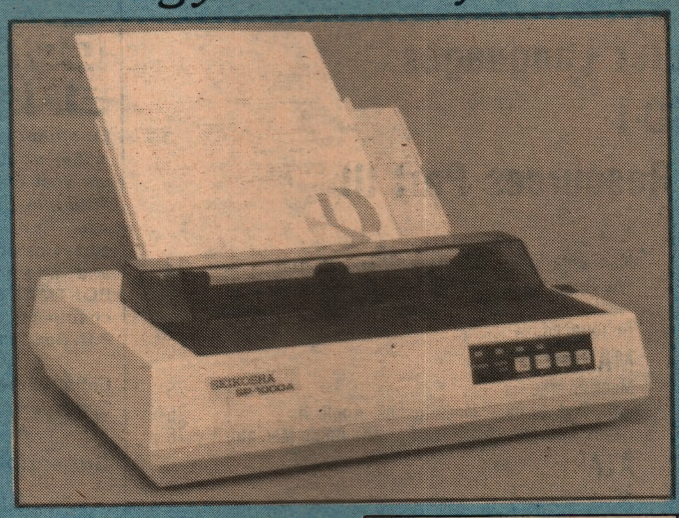

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<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
EFGHIJKL
789:;<=>?@ABCD EFGHIJKLMNOPQ
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In order to keep your loyalty we at MidWest Micro are always looking for more printer and less price. In that search we've found for you a real gem in the price/performance arena. The Seikosha SP-1000 is made with the same precision and durability you have come to expect from the quality leader in the watch industry – Seiko.

The SP-1000 is completely full featured with the latest advances incorporated. It provides excellent near letter quality printing with a dense 24 by 18 dot density. This equates to 41,472 addressable dots per inch and gives superb "typewriter like" printing. Other printers with resolution this high cost hundreds of dollars more.

With the SP-1000 your computer can print 40, 48, 68, 80 or 136 characters per line. It can print 35 separate character styles including 13 double width and 3 reversed styles. You get Pica, Elite, Condensed and Italics – plus true superscripts and subscripts. All this can be done automatically, through easy commands right from your keyboard.

You get all these great features plus much, much more with the SP-1000 and there is a model made to fit your application. (This saves further in interfacing costs and problems). So call today to order or ask for a free brochure and print sample.

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- Automatic printing.
- Optional intelligent serial interface (#SP-80010)
- Downloadable Characters.
- Standard 1.5K buffer.

Character Font			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (Character/Inch)	Print Speed (Character/Second)
Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column		600 dot column
	Double Density Graphic		nx8	960 dot column		490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column		600 dot column
	Quadruple Density Graphic		nx8	*1920 dot column		*980 dot column
	640 Dot Graphic		nx8	640 dot column		326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot column
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

*Indicates that the specified figure includes half dots

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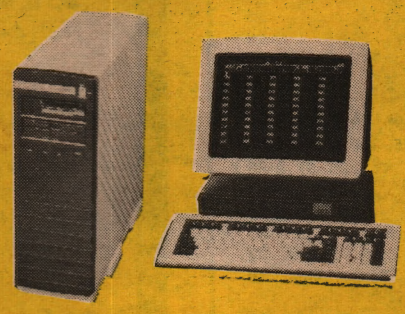

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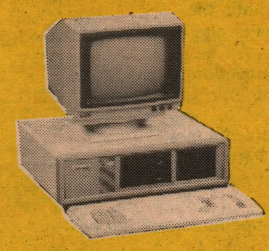

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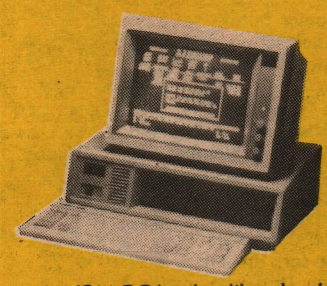

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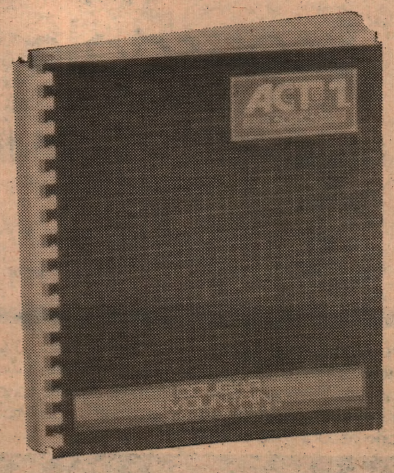

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Trends In Computer Languages

by Stan Veit

Although computer literacy has been tied to learning computer languages by schools and colleges, the fact is that most people do not program in the programs we call "languages." If people had to enter their problems into the computer using "languages" the personal computer would have never reached the common usage it has achieved. No they use dBase, Lotus 1,2,3, SuperCalc, Multiplan, Framework, and all the other systems which have evolved to solve the problems of living and business. Don't tell the millions of users that they are using computer languages, or they might panic. The truth is that databases are Data Description Languages, spreadsheets are Matrix Description Languages and word processors are Character Storage and Formatting Languages. In fact any method we use to instruct the computer other than the storage, movement and arithmetic combinations of binary code is a computer language.

Don't tell the millions of user's that they are using languages or they might panic.

The first personal computers operated with 8-bit chips which had been manufactured to move 8-bit binary code in and out of registers, to perform binary arithmetic and to place binary codes on a bus for transmission to external memory chips. The particular set of codes which causes all this to happen is called the "instruction set" and each microprocessor has a different set of instructions although many are similar. We also use this same set of binary bits in another type of code, this is called the American Standard For Information Interchange (ASCII) and we use it to code all the information we want the computer to use as data.

Now the microprocessor chip doesn't know the difference between "1s and 0s" used as instructions and the same binary bits used as data. Only the time when it receives the code makes the difference. It is really up to the programmer to make sure that the CPU gets instructions when it needs them and data when that is needed. One of the main causes of computer crashes is when the CPU expects to receive instructions and it gets meaningless data instead. Entering the data and instructions in binary code is called Machine Language and it is really the only language the computer understands.

Most humans do not have the ability to memorize long strings of binary numbers and to use them in directly programming the CPU. Therefore we invented alpha symbols to represent the computer instructions. "LDA" (Load Register A) is a lot simpler to remember than an 8, or 16-digit binary number! We use this system to develop Assembly Language which can directly control the functions of the CPU throughout the program but uses alpha characters in place of binary numbers. Once the program is written we run the Assembler program which translates it into machine language. Assembly Language also takes care of such things as program jumps and returns and keeps track of things in general. The price we pay for making Assembly Language more versatile is that it has become harder to learn.

When the time came that scientists and business persons wanted to program computers, an easier method of programming a computer was needed. Languages that more closely resembled English were invented and called High Level languages. These could be programmed in mathematical form (FORTRAN) or business terms (COBOL). The language would then translate the program into machine language for the operation of the computer.

Today very few computer users program in a "language" while millions enter problems, solve them and output results without even thinking about how it is done. It is just that computer language has gotten so much smarter and has the ability to control computer resources that never existed before.

Computer languages have the ability to control functions that never existed before.

In spite of all this formal, general computer languages are alive and doing very well with today's technology. Those who choose to use them for program or system development have the ability to control our complex computing resources with almost unlimited memory, disk storage and input/output capabilities.

This article just skims the subject and gives you some idea what is going on in the field of computer languages. Throughout this issue you will also find other articles describing languages now in use. You can also try many of these languages at a low cost. It used to cost hundreds of dollars to purchase computer languages. Now you can find language versions in many public domain collections, however it is even cheaper to buy languages from Ellis Computing of Reno, Nevada at $39.95, from Borland International of Scotts Valley Ca. or Pecan Software, Brooklyn, N.Y. These companies provide excellent language packages including documentation at a very low cost.

Interpretive vs Complied Languages

A program is written using some kind of a text editor. The format of this program must conform to the specific format required by the computer language or you will get a syntax error when you try to use it. The file obtained after writing the program is called the source file. In order for the computer to understand the instructions in the source file, they must be translated into the only language the computer can understand, binary code. With some languages you store the source code and when it is run, the language translates it on a line-by-line basis and then runs the program during the process. No matter how many times the program is run, it must go through the same process. This is called interpretive language.

Other language versions translate the source file prior to the time is to be run. The resulting machine code file is called the object file and is stored in the computer memory ready to be run at any time without further translation. This is called compiling and the languages that operate this way are called Compilers.

There are good points and bad ones to each method of language translation. The interpretive language can be modified or corrected very easily. The bad part is that it is a very slow process, every time it is run, it must be re-compiled.

The Compiled language runs very fast but if any change is required, you have to go back to the source file, make the change and then re-compile the program to obtain a new object file.

Many languages have both forms and there are even some languages

continued on page 10

A Funny Thing Happened In San Diego

by Stan Veit

The computer language Pascal was written by Professor Niklaus Wirth at the ETH Technical University at Zurich, Switzerland and named in honor of Blaise Pascal famous French mathematician of the seventeenth century. Pascal was originated as a teaching language, one that would enable students to develop good structured programming habits. This would enable them to write large and complex programs in a manner that avoids many of the errors that plague less structured languages such as FORTRAN and BASIC. The only documentation for the language was Wirth's definitions published in 1971. However in 1975, *Pascal User Manual and Report* by Kathleen Jensen and Niklaus Wirth was published by Springer Verlang, New York, NY. This book remained the "bible" for Pascal for some time although it went through several editions and minor changes were made by the authors who never considered it as a specification.

Pascal was originally implemented only on mainframes and therefore was not accessible to students in schools without this kind of equipment. In 1974 a project was started at the University of California, San Diego to bring Pascal to the DEC PDP-11 minicomputers that many schools were starting to have for student use. This project was under the direction of Dr. Kenneth Bowles, Director of the Institute for Information Systems at UCSD and succeeded in developing a complete software system called UCSD Pascal.

The next objective of the UCSD Pascal group was to port this new language to as many minicomputers and later microcomputers as possible and to win converts for the system across the world.

It was now 1977 and microcomputers with disk drives and a reasonable amount of memory were starting to appear in schools, businesses and in homes. The project made deals with several computer manufacturers granting them irrevocable licenses to use UCSD Pascal. The companies so favored made generous grants to the project both in cash and equipment. They included Apple Computers, North Star Computers, Alpha Micro and Western Digital. Apple Pascal became the basis for ProDos and much Apple software. North Star, and Alpha Micro supported the language on their machines while Western Digital made a computer with UCSD Pascal microcoded into the CPU. It was called the Pascal Microengine.

In addition to these deals, the project made a distribution of the language and system to colleges, universities and to computer clubs at almost no cost. Within a year, Pascal became one of the most used personal computer languages. If you had a Z80, or 6502 based computer with a disk drive and you belonged to a club, you could get UCSD Pascal for little more than the cost of a disk. The documentation was also available for the copying charges. While these versions still had bugs, Pascal was a better language than BASIC and the P-system as it came to be called, was as good an operating system as CP/M. Everybody was happy!

Now comes the black part and no one can say who was the guilty party. Some say the IRS, some the Regents of the University, some say the devil or the state government, no one who will talk really knows.

It was decided that the UCSD Pascal Project was in BUSINESS and that would hurt the tax exempt status of the University! There is nothing more sacred than the tax exempt status of

continued on page 10

Alice—Pascal Programming By The Numbers

by Stan Veit

Alice is an advanced interpretive Pascal environment based upon WATCOM Pascal as described in *WATCOM Pascal Tutorial and Reference Manual* by F.D. Boswell, T.R. Grove, and J.W. Welch. This is a superset of Standard Pascal (ISO Pascal). It contains all of the features of standard Pascal and more. It also supports most features of Turbo Pascal from Borland International.

As published by Software Channels of Toronto, Ontario Canada, Alice is a method of learning Pascal by means of filling in templates and following simple menus in windows.

It is about as painless a method of learning Pascal as can be devised short of hypnosis. It works!

Once you have learned Pascal through Alice, you have a "Personal Pascal" that most people who have occasional need to write a program can use effectively. True, USUS Members and Turbo users will look down upon this interpretive form of the language, but I feel it is good enough for most small applications. In addition, once you know Alice, you will have no trouble changing to Turbo Pascal and on to UCSD Pascal if you so desire.

It is the structured format of Pascal that makes Alice possible. Every Pascal program has exactly the same format and is expanded in the same way. Because every simple Pascal statement can be expanded into a compound statement, Alice can provide for increasing orders of complexity as the student learns the language and how to manipulate the program. By using modern graphic and window features, Alice teaches the user how to program in Pascal, all the student need bring to the environment is the logic needed to form the program.

It should be noted that Alice does not claim to teach Pascal. You should read textbooks on Pascal before you use it, but if your exposure to the language has been limited, Alice will enable you to start to program at once.

I learned Pascal by being given a copy of Jensen and Wirth and a sixth generation xeroxed copy of the UCSD Pascal Manual. Having just been appointed to sell the Pascal Microengine I had one weekend to become an "expert." Ha!

It is a tribute to the Master, Niklaus Wirth, that six months later I was teaching Pascal at college level. Alice how I would have loved you!

When I taught Pascal, I spent much of my teaching time in the lab helping people de-bug programs where they had left out a semi-colon or a period or a parenthesis, or an "end." How I wished that I could have devoted that time to actually teaching programming rather than syntax. Alice would have freed me to do just that.

Sooner or later everyone must raise their "training wheels" and ride on two wheels by themselves. I do not know if Alice will prepare learners for that day or not.

A word about the Alice editor, it is simple to use and very fast to learn. The many windows and menus are a great help and the use of function keys is efficient and easy. The de-bug features is also simple to use and even a real duffer will find it easy to locate bugs.

While Alice is interpretive and Turbo Pascal is a compiler, it is perfectly possible to use most source level code with the other version. The Alice Users Manual fully describes how to do this and the exceptions and differences.

Alice sells for $95.00 and the package includes both the tutorial and the User Guide, both are excellent and easy to use.

I recommend Alice to anyone seeking a fast way to learn Pascal. However, if money is an object rather than pain, I would rather you buy Turbo Pascal from Borland, or UCSD Pascal from Pecan Software. Perhaps I have been brainwashed at the gym, its got to hurt to do you good!

Software At Waterloo

In another article in this issue, *A Funny Happened At San Diego*, I mention, that the UCSD Pascal Project at the University of California, San Diego was closed down and its product was licensed to SofTech Microsystems because there was danger of the University losing its tax exempt status by conducting a software business.

In Canada, The University of Waterloo in Ontario is also a center for the development of fine software. They have developed versions of many languages and are world famous for their WATCOM software. Here the software development was spun-off to become a commercial company, but one closely associated with the University. I do not know the details of this association, but as a result, Waterloo is a world class software development center.

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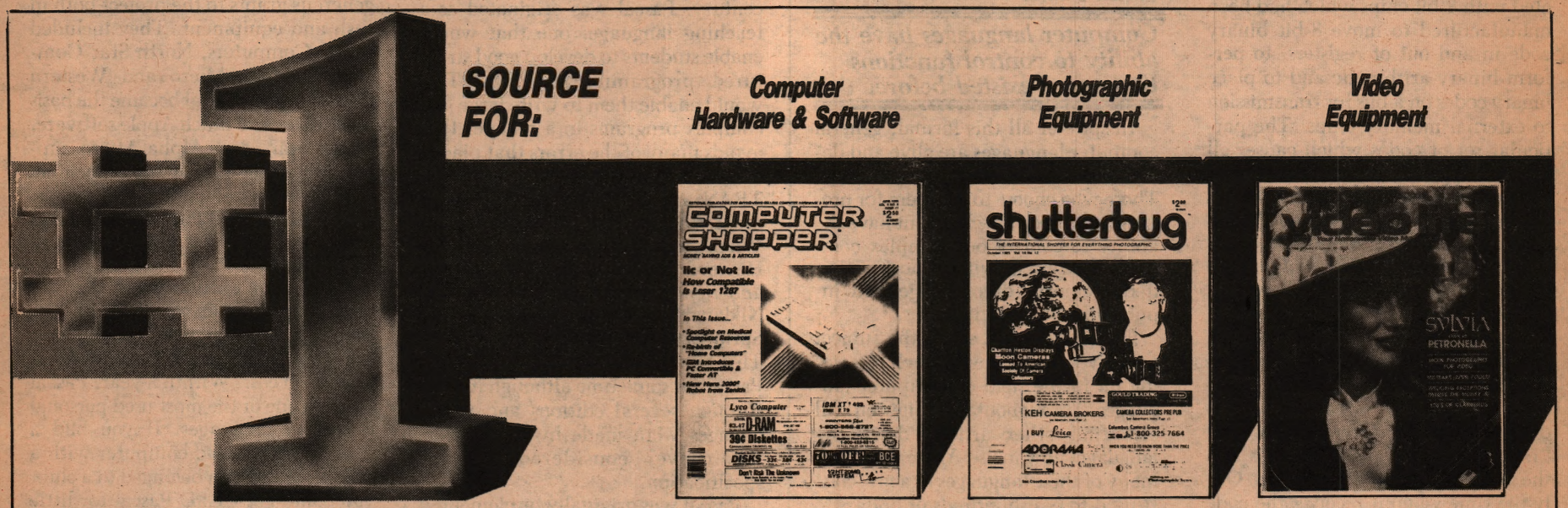

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Editorial

By Stan Veit

All This And Bargains Too!

This issue marks a new beginning for *Computer Shopper* magazine. You could not fail to notice the attractive cover, or the improved printing by the time you reached this page, but the improvements extend far beyond this point. Close the magazine for a moment and look at the binding. In the trade this is called "Perfect Binding," because it is for this kind of book. It keeps the pages together, provides the ability to store the issue on your bookshelves, and has a flat spine with the volume identification on it. We have come a long way in the past four years. *Computer Shopper* started almost six years ago as a shopping paper for used and new computers printed on yellow newsprint. It served a purpose by providing a marketplace to buy and sell personal computers, peripherals and software. There were so few people interested in trading in these new little computers, that it took a national publication to locate the customers. *Computer Shopper* filled that need and so it grew.

People started writing in asking questions about the advertised equipment and asking for help in buying computers. To answer these letters, columns were started and the editorial content grew. Then in 1983, I came on board as Editor-In-Chief and we proceded with our goal of providing you with a computer publication different from all others.

We sectionalized the magazine so that people with machine specific interests would find a place that covered their computer and yet gave them an insight into what was going on in the rest of the computer world. We said to our readers "buy your machine specific magazine, but buy *Computer Shopper* as well to get un-biased, hard hitting information, free software and big bargains." You have responded and you have made *Computer Shopper* into one of the most important magazines in the industry. This product improvement program is only one of the rewards you will get from buying *Computer Shopper*.

Every Editor and every magazine is slanted in their selection of news, articles and even ads. Many are slanted towards the system they represent, and the advertisers who pay the bills. We are somewhat different, because we are slanted in "your favor." Our editorial policy is directed to your advantage, our ads are bargains for you. People who sell at high prices do not advertise with us, the competition is too great, the buyers are too sharp. Our readers know a good thing because we tell them about it.

What's Ahead?

Our new production method enables us to do a lot of things we could not do before. We can print more illustrations in color and reproduce photographs so they look as good as possible. We can print program listings so you can read them and we hope to get rid of the endless article jumps you hate so much.

We have expanded our coverage of the Atari ST until we are now one of the leading magazines on that subject. We are going to take you inside the hardware and software for this new popular machine.

Our coverage of Commodore Amiga is also expanded, but we will not ignore the C-64 and C-128—never!

The C-64 computer is like the C-47 (DC-3) airplane, it has become the workhorse of the industry and its going to be around a long, long time.

We are going to increase our Apple II and Mac coverage and include Apple II CP/M.

The TI 99/4A and Timex/Sinclair fans will continue to have a home here and so will the robots.

To serve the majority, we will continue with our coverage of MSDOS, Unix and whatever runs on PC/XT/AT and all the clones. In fact *Computer Shopper* is going to become the "Clone Clearing House."

You may very well ask, "How are they going to do all that?" Well, we are doing most of it right now and we intend to get better. ●

Summer CES—Seems (a Bit) Like Old Times

by John J. Anderson

When I attended my first CES show, way back in 1982, the electronics industry as a whole was just beginning to discover a place for the personal computer in its scheme of things. A bunch of techies, nerds, kids, and combinations of the above, with a smattering of the lunatic fringe, were achieving success in the marketplace.

The big guys smelled some money to be made, and began to move in.

A couple of years ago, all the big guys were into computer hardware and software, elbowing the little guys right out of the action. Consumer computing was big business, and the big boys were there to make a killing. A lot of big boys, and little guys, ended up dead.

Last year you could hear the wind blowing through West McCormick Hall, Chicago. There were tumbleweeds blowing by the software booths. The consumer computer industry was moribund, and everyone you talked to was either depressed or disconnected. Not long after, my magazine alma mater of four years, *Creative Computing* magazine, folded into the ether. Rest in peace.

But the reports of the death of the home computer industry were greatly exaggerated.

This year, I am extremely happy to report, there has been a renaissance for the home computer hardware and software presence at the Consumer Electronics Show. I daresay that even a shred of the old spirit, that of the entrepreneurs, the dreamers, and the techies working out of their garages, began to reassert itself along the corridors of the basement of West McCormick Hall. Without doubt, there has been a retrenchment, and a redefinition of the market. But the deadwood, of which there has been so much for so darned long, has finally washed away. Underneath, as predicted by a few stalwart believers, is an industry very much alive.

Let's examine a software example: Batteries Included, of Ontario, Canada. They have not only weathered the worst of the storm, but have actually managed to thrive during extremely rough conditions. Owing to a strong product line and experienced management, the company has managed to benefit rather than be victimized by the shakeout. Now they are diversifying, merging, and going public.

Let's consider a hardware example: Atari Corporation, of Sunnyvale, California. Jack Tramiel has managed one of the biggest turnarounds in the industry, while dozens of pundits lined up to shout it couldn't be done. The ST series of machines has generated excitement in a marketplace that had been, and to some degree remains, in a state of shock. Business is war, says Jack, and he has assembled some of the best troops around. If there is any consumer market to be had, he is determined to win it.

Unfortunately the Amiga was not to be seen at the show, except in the software displays of Epyx and Datasoft. Commodore was hard at work launching its 64C, which is a 128 with the back (and 64K) cut off. There was quite a contrast in tone between the Atari and Commodore booths, but that is probably more a reflection of show commitment than anything else, so it would be wrong to draw conclusions from it. But I was sorry to discover that Commodore views the Amiga as a business machine, and fear that is another in a series of mistaken judgments.

At least Commodore was there—more than can be said for Apple. Scully, President of Apple, claims that profits are way up, and maybe skipping shows has accounted for part of this. Apple has decided it doesn't need Comdex or CES, and maybe it is right. But the problem with Apple-only shows is that they don't generate converts—everyone who shows up is a believer already.

Nintendo was present once again, in its million dollar booth, trying to convince the American consumer to spend $150 on a dedicated videogame. Bankrolled by tremendous success in Japan, I'm sure they are somewhat bewildered by the resistance of the U.S. market. Despite the fact that the shooting games are lots of fun and Super Mario Brothers is a terrific game, it is highly doubtful that dedicated gaming units can once again penetrate at a price point of much over $50.

Not about to allow Nintendo escape with the vapor market, Sega demonstrated its own dedicated game machine. They are either gluttons for punishment, or they know something I honestly don't.

Microprose is alive and well, and selling its wargames and flight simulators. Conflict in Vietnam depicts the 30-year struggle of forces in Southeast Asia, in hi-res color graphics. The sequel to F-15 Strike Eagle is due out this fall, simulating a new warbird. The company promises it will feature compelling graphics, highly accurate terrain features, and authentic weapons systems, plus mission scenarios that provide combat challenges drawn not only from current headlines, but also from realistic simulations of potential conflicts around the world.

Epyx is still very much kicking, and among other things demonstrated a beta version of Championship Wrestling, an amusing package that mimics the slightly lurid world of professional wrestling, with all its mean, nasty, colorful characters. They score points and reduce their opponent's stamina through the use of successful throws and holds—moves like the Atomic Drop, the Pile Driver, and the Clothesline. The graphics are terrific, and you can even use the ropes to gather momentum for a slam. According to Epyx, "now players can slam bodies, crush heads, break kneecaps and smash noses in the privacy of their own homes." ●

Trends In Language
continued from page 7

where the program is first complied and later interpreted. This is done to increase portability among various computers.

BASIC

Trying to debug a very large BASIC program is like trying to map a bowl of spaghetti.

BASIC was invented by Professors Kemeny and Kurtz at Dartmouth College in 1963, to teach college students how to use a time-shared computer without learning the complete FORTRAN language.

With the development of the personal computer, BASIC was selected as its primary language because it is the simplest language to implement on a small computer and it is easy to learn. In fact BASIC has become the truly universal language. It is used and understood all over the world by millions who speak and read totally different non-computer languages.

Many personal computers now use some form of Microsoft BASIC as the primary language of the computer. You should not dismiss this language just because it comes with your computer at no extra cost. Modern BASIC is a powerful language and has extensions to control graphics, color, sound and communications. It is rather easy to learn and you can go a long way with just BASIC. Most versions supplied with the computer operating system are interpreters, but excellent compilers are available. You can write a program in BASIC and test it in the interpretive mode. When the program is correct, you can compile object code from your program file and have two versions for future use.

The problem many people find with BASIC is its complete lack of structure, the ability to declare variables at any point and the endless GOTOs can cause confusion with large programs. It has been said that trying to de-bug or change a very large BASIC program is like trying to map a bowl of spaghetti.

Pascal

While FORTRAN and COBOL were being developed in the United States, other languages were being invented in Europe. Algol 60 was one of these and it was the basis for the development of Pascal which is more powerful and easier to use. Pascal was developed by Niklaus Wirth at ETH, a technical school in Zurich, Switzerland. Wirth developed a language that was strongly structured and portable to many computers. He taught Pascal and co-authored a book *Pascal User Manual and Report*, Kathleen Jensen and Niklaus Wirth, Springer Verlang, New York. In the absence of a formal specification for Pascal, this book became the standard for the language. Pascal was adapted for American microcomputers by a project at the University of California, San Diego. This resulted in a version called UCSD Pascal which rapidly spread through the world. The University licensed this language to several computer manufacturers and to a software company, SofTech. The resulting price increases for the product all but halted its spread among new users until a new version, Turbo Pascal was introduced by Borland International at a very low price. Today Turbo Pascal is one of the most popular languages for MSDOS computers and much software is written in Pascal. It has many advanatges over BASIC but the principal one is transportability and the ability to understand what the program is about, to correct and modify it.

The UCSD version has now been re-issued by Pecan Software at a very low price and is undergoing a rebirth for MSDOS computers.

Modula-2

Niklaus Wirth has seen his Pascal language become one of the prime computer languages in the world, but at the same time, he has realized its shortcomings and wanted to extend its control over certain data types. To this end he has written a new language called Modula-2. There is an article on this language elsewhere in this issue.

ADA

ADA is not something that is going to go away because programmers do not like it.

Once again the United States government has mandated the use of a new computer language (last time it was COBOL). This time the Department of Defense has adopted a new language for all computer transactions to be used internally and with its contractors. The committee that selected the characteristics of this language determined that it should be based upon Pascal but there the similarity ends. ADA is a big system and a powerful language designed to run on big computers. The DOD has refused to let any sub-set call itself ADA and only since the development of our modern generation of 16/32 bit personal computers has it been available to us. The language was originally proposed in DOD Proposed Standard *Reference Manual for The ADA Programming Language* which was amended by the 1983 Specification for ADA. There is now a version for PC/XT/AT MSDOS computers published by Artek Corporation 100 Seaview Drive Secaucus, NJ 07094 for $895, however you can

continued on page 18

Alice
continued from page 8

Somehow in the United States, it seems that people view as somehow evil, the development of products with commercial value by our great centers of learning. Then they complain about "ivory towers." It simply does not make sense to me.

For additional information contact Software Channels Inc., 4 Kingwood Place, Kingwood, TX 77335; (713) 359-1024 or 212 King Street West, Toronto Avenue, Canada M5H-1K5; (416) 591-9131. ●

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H028

A Funny Thing
continued from page 7

a University for hereby lie all the grants, behests and endowments which are its life blood. Even in a state supported University this is sacred.

The answer was to get rid of the project, not close it down, heavens no, sell it to a business organization and let them run it at a profit. The Regents of the University would still own the system but the software company would run it and pay a license fee to the school. Just like having an oil well on the school campus.

The company selected to take over UCSD Pascal was SofTech Microsystems an experienced minicomputer software firm. They hired many of the programmers on the project and proceeded to come out with a new version to clean up some of the bugs.

SofTech also sent out letters to all the clubs and schools who had received copies of the software for distribution saying STOP! All previous licenses were canceled and would not be renewed. You could keep running your software but you couldn't give it to anybody and you would not get any upgrades. This sent a roar of anger across the country but SofTech said, "Hang on there, soon you will be able to buy this new version at a reasonable fee and you will get support." The new version came out but SofTech's idea of "reasonable cost" was about $500. Not only that but they proved to be one of the most arrogant bunch of people in a business filled with swelled heads. Programmers quickly found other versions of Pascal because UCSD Pascal lost its glow very quickly at $500 and up a copy, for use on one machine. The manufacturers like Apple cut themselves loose and went their own way. When the IBM PC came out, UCSD Pascal was one of the operating systems supported on the computer. How many PC owners do you think bought it for $500 when DOS cost $60! Not only that, Microsoft and IBM both came out with Pascal running under DOS.

Borland International dealt UCSD Pascal and SofTech the final blow when they introduced Turbo Pascal for under $50 and it worked like a charm. True it does not have the bells and whistles of UCSD Pascal but running under DOS it does not need them.

Dr. Bowles left when the project died and went into business selling software by electronic mail.

Finally SofTech was bought by another company who decided that they didn't need to be in the Pascal business. The Regents of the University now have licensed a new company called Pecan Software Systems of Brooklyn, NY who now fully support an improved system and sells it for $79.00 including excellent documentation. The Pecan version compiles into native code if selected by the user. It has many features not found in Turbo Pascal and is a much more complete software system. Pecan was founded by members of USUS, the UCSD Pascal Users Group and is supported by on-line SIGS on most of the major on-line services. ●

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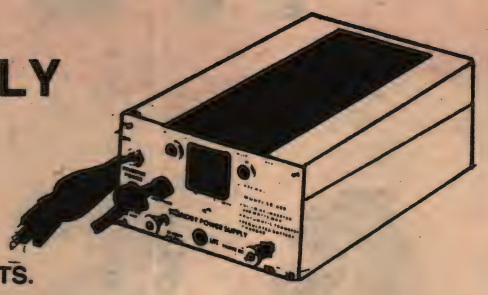

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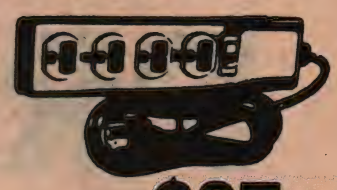

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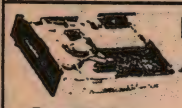

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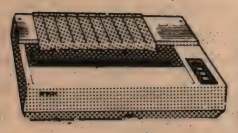

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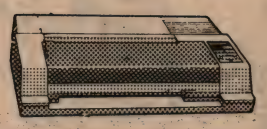

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Trends
continued from page 10

get a demo disk for $29.95. ADA is not something that will go away because programmers do not like it or think it is overly complex. The Defense Department is writing this requirement into more and more contracts and when all DOD contractors start to use ADA that will represent a very large segment of the US and Canadian industry. ADA is more than a trend, it is a certainty. One more thing, if you are a government contractor and you receive an Invitation to Bid on a contract which has a clause specifying the use of ADA, you had better find out just how much it is going to add to your bid price. It may make a whole lot of difference in your price.

The C Language

The C language was developed at Bell Labs and it is the language in which the Unix Operating System is written in. Not only that, but the trend today in writing any major software system is to do it in C rather than in Assembly Language. In addition, when a new computer is developed, the trend is to bring up C as its first language and to develop the supporting software in C. The reason for this is the complete portability of C among many different computers. As indicated by the article by Andrew Fried in this issue, C is not completely a "high level" language because it permits the programmer to access the programmable aspects of the hardware and to work with them to a greater extent than almost any other language. Learning to program in C is somewhat harder than using other languages although it is somewhat like Pascal, or Modula-2. C is presently the most important language in use today for development work.

Forth

Forth is also a semi-high level language that permits use of the internal hardware registers and programmable aspects of the system. If we consider machine language to be at one level of programming, Assembly Language at a second level and high level languages at the third level then Forth is at the fourth level. Forth is essentially a Stack Manipulation language where the commands are known as "words" and the language is extendable according to the needs of the user. The BASIC language only occupies a small Kernal within the computer. It is completely flexible and allows extensions to be made to the language as new screens are added. Forth is one of the languages that is being used to develop "artificial intelligence."

Lisp

Unlike other languages, Lisp is a list processing language. Other languages deal in numbers and logical constructions but Lisp deals in words, and combinations of words called lists. A list in Lisp is a sequence of elements in which each element is either an atom (single object) or another list. Notice that the word LIST is part of its own definition, that is, a list may be a sequence of lists. This is called recursion which means that its definition includes itself. While recursion is possible in other languages such as Pascal and C, in Lisp it is vital to it's a operation. A Lisp program is actually a Lisp list. This means that a Lisp program can be treated as data by another program, or even by itself. Lisp is always an interpreted language and it has a very simple structure consisting of Atoms, Lists and Procedures.

This unique language has proven to be of great value in experimentation on artificial intelligence and robotics. In the United States, Lisp is the main language in the AI field.

Prolog

Prolog is another language used in AI. In Europe it was adopted because it used less computer resources than Lisp required. In Japan, Prolog was adopted as the language of the "Fifth Generation" project in AI.

Prolog relies on the use of logic to solve problems. Prolog is basically a theorem-proving system. It uses a formal logic technique known as "predicate calculus" to prove the truth of

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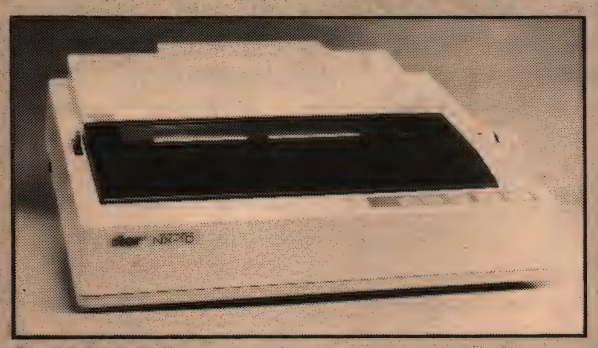

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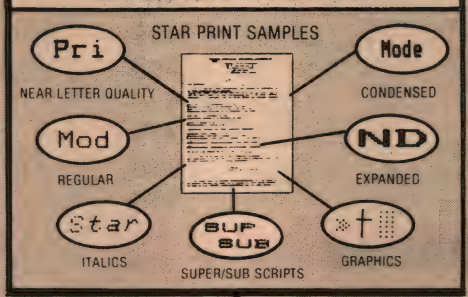

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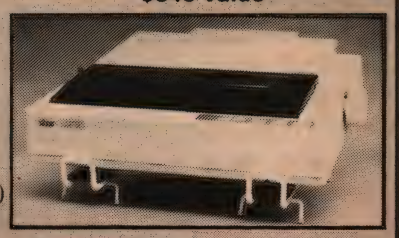

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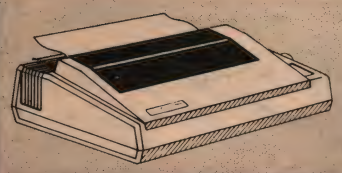

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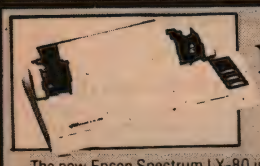

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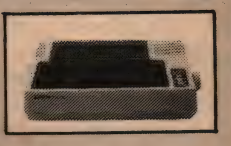

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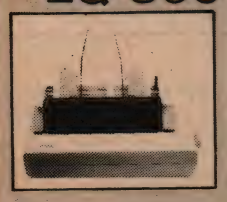

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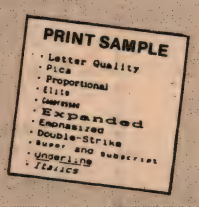

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SPECIFICATIONS

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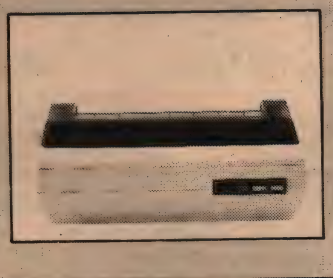
Print Method: Impact dot matrix, bidirectional, logic seeking in both text and graphics
Print Speed: 420 CPS/Draft; 104 CPS/Correspondence Quality; 2500 dots/sec standard graphics; 1250 dots/sec high density graphics
Print Head: 8-pin staggered arrangement
Character Sets: Standard 96 ASCII printing in 17 fonts
Line Spacing: n/180 in. (0-255)
Paper Feed: Pin feed (paper width adjustable) and built-in friction feed
Paper Width: 5 to 15 inch (pin feed); up to 16 (friend)
Paper Path: Rear and bottom entry

NEW! EPSON DX SERIES DAISYWHEEL SPECIALS

We understand you have some questions. . . And **YES** *we have some answers. . .*



Productivity is very important to us. How fast are the DX-10, CX-20 and DX-35?
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How versatile are the DX Series Daisywheel Printers?
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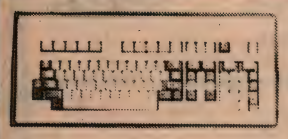

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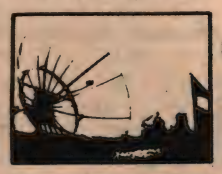

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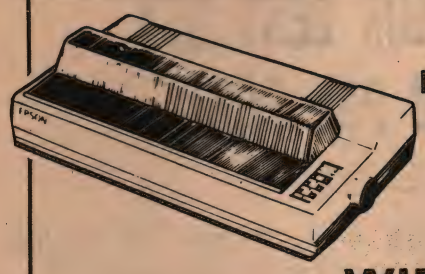

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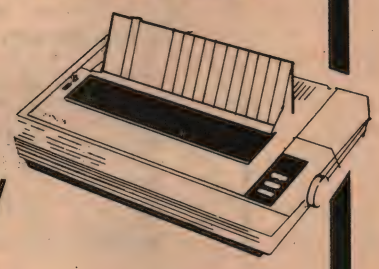

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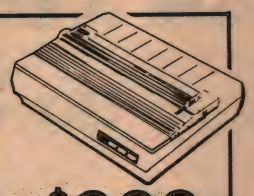

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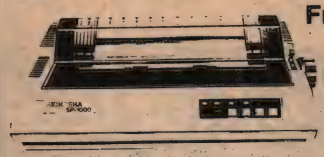

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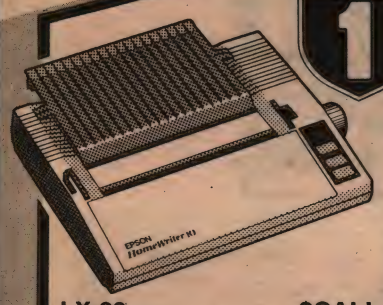

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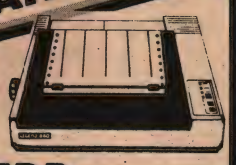

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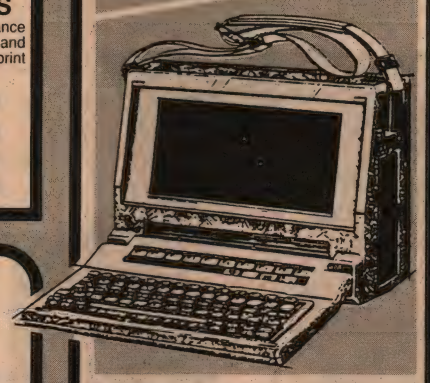

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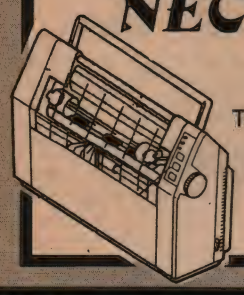

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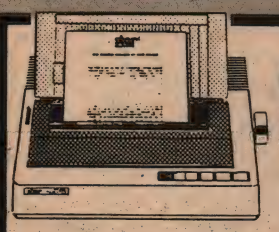

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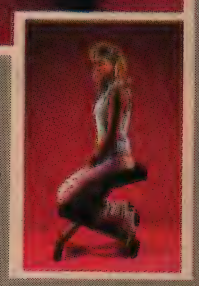

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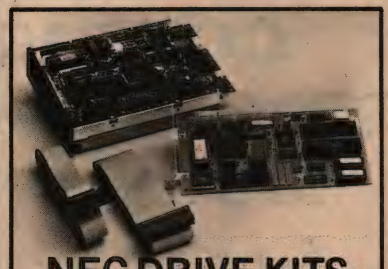

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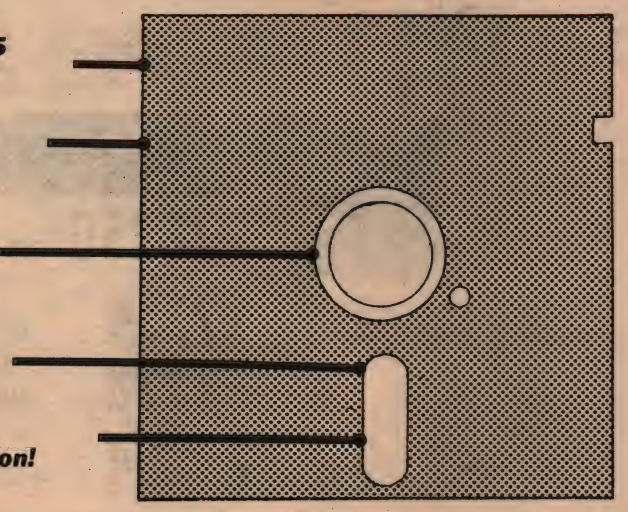

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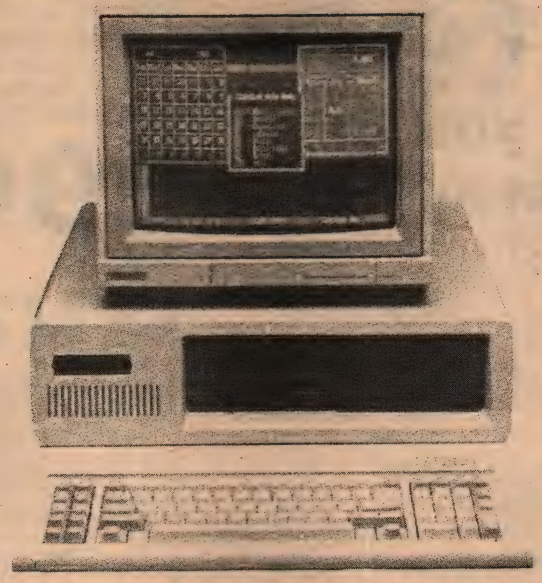

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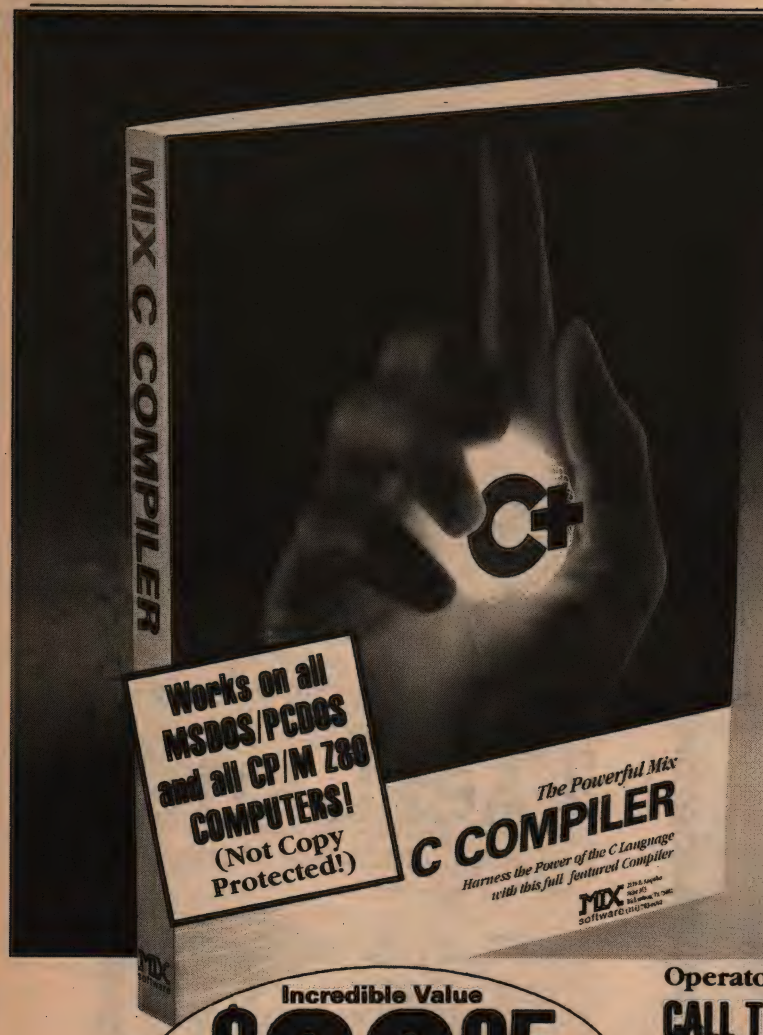

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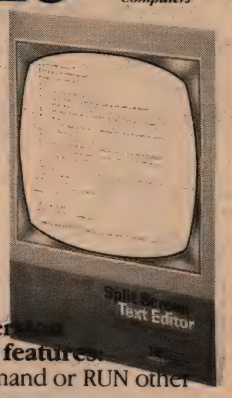

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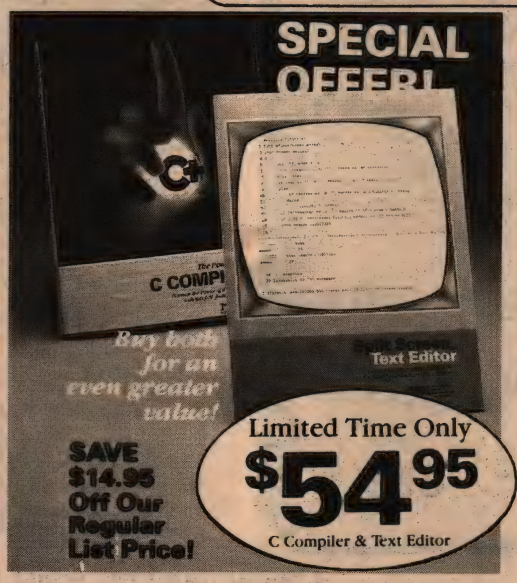

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IBM PC, 256K, 2 DS/DD, cont, kybd.	8	$1099.00
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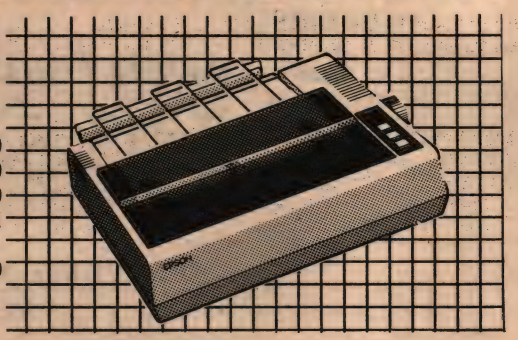

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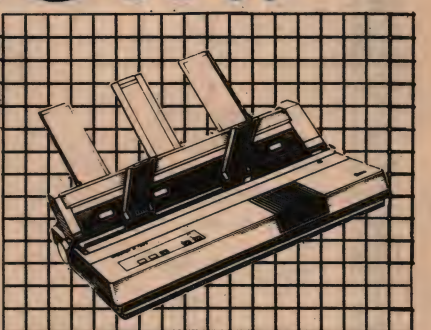

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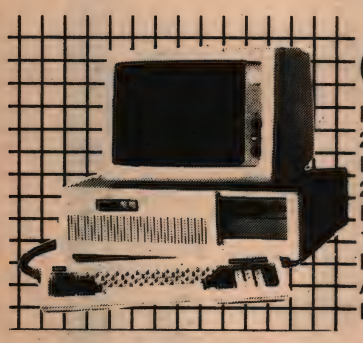

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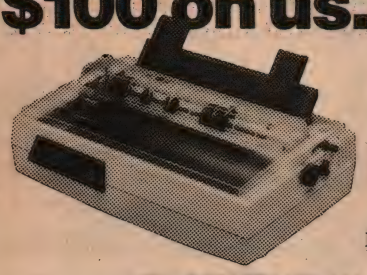

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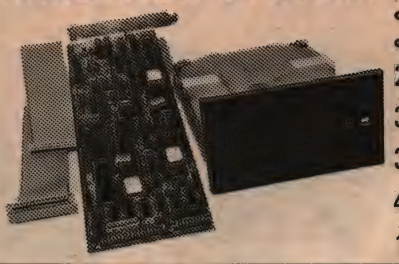

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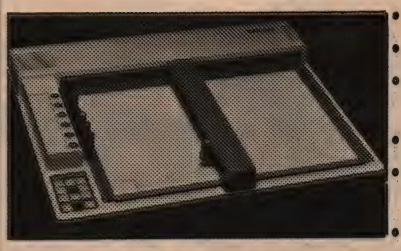

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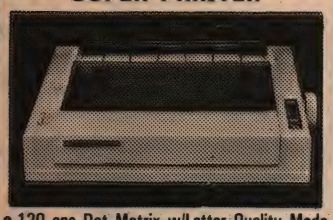

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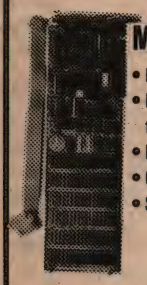

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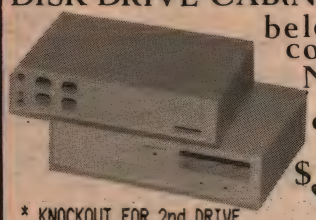

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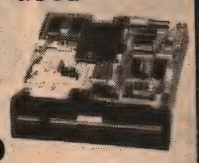

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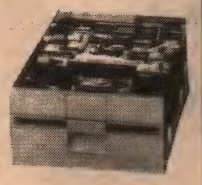

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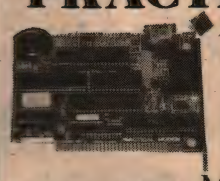

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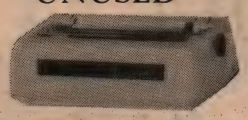

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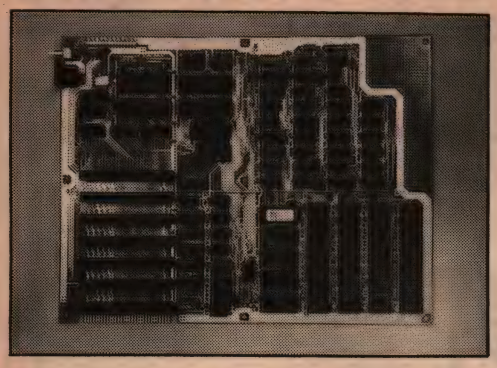

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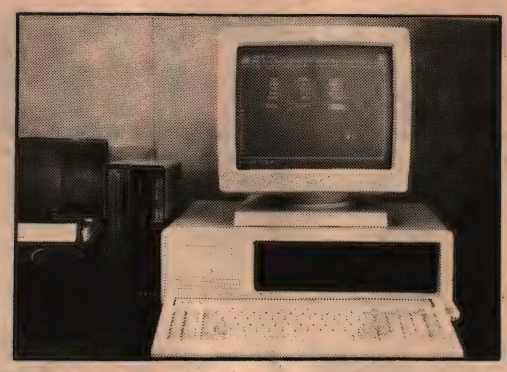

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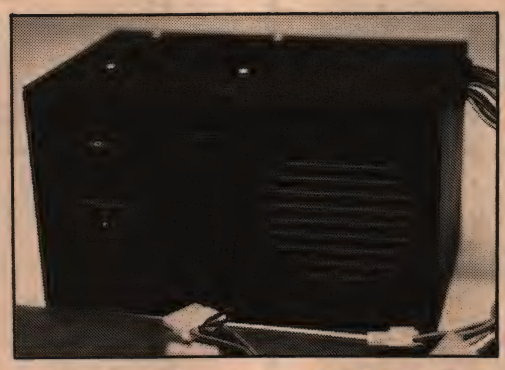

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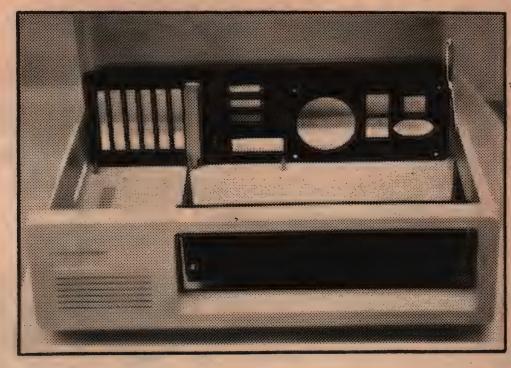

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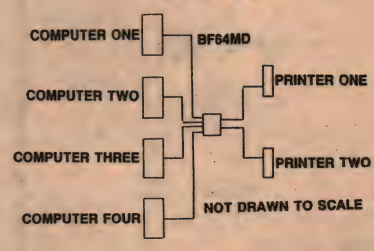

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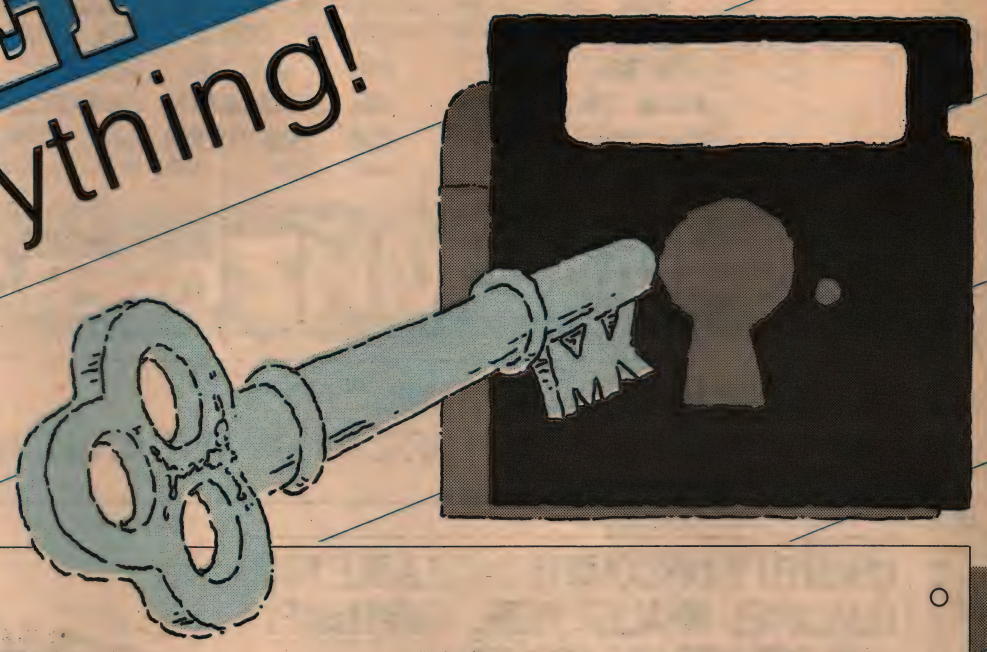

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A>DEBUG
-N PROGRAM.COM
-L
-D 100 129
33CB:0100  EB 0B 40 05 56 65 72 73-20 31 2E 38 31 50 B4 30   k.@.Vers 1.81P40
33CB:0110  CD 21 86 E0 3D 36 01 72-05 3D 0A 02 76 09 BA CB   M!.`=6.r.=..v.:K
33CB:0120  03 B4 09 CD 21 CD 20 58-EB 2F                     .4.M!M Xk/
```

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turn this: into this

instantly and automatically with a turn of **MASTER*KEY**!

```
OFST  ASCII  OBJCODE     SRCECODE
                         ;Program:  PROGRAM.COM
0100         EB0B        H0100:  JMP     H010D
                         ;-----------------------------------------------
0102         40                  INC     AX              ;NON-BRANCHED CODE
0103  Ve     055665              ADD     AX,6556h
0106  rs     7273                JB      H017B  ;. . . . . .
0108   1     2031                AND     [BX+DI],DH
010A   .     2E                  DB      2Eh
010B  81     3831                CMP     [BX+DI],DH
                         ;-----------------------------------------------
010D  P      50          H010D:  PUSH    AX
010E   0     B430                MOV     AH,30h
0110   !     CD21                INT     21h             ;get DOS Version#
0112         86E0                XCHG    AL,AH
0114  =6     3D3601              CMP     AX,0136h
0117  r      7205                JB      H011E  ;. . . . . .
0119  =      3D0A02              CMP     AX,020Ah
011C  v      7609                JBE     H0127  ;. . . . . .
011E         BACB03      H011E:  MOV     DX,03CBh
0121         B409                MOV     AH,09h
0123   !     CD21                INT     21h             ;display string, DX
0125         CD20                INT     20h             ;terminate normally
                         ;-----------------------------------------------
0127  X      58          H0127:  POP     AX
0128   /     EB2F                JMP     H0159
                         ;-----------------------------------------------
```

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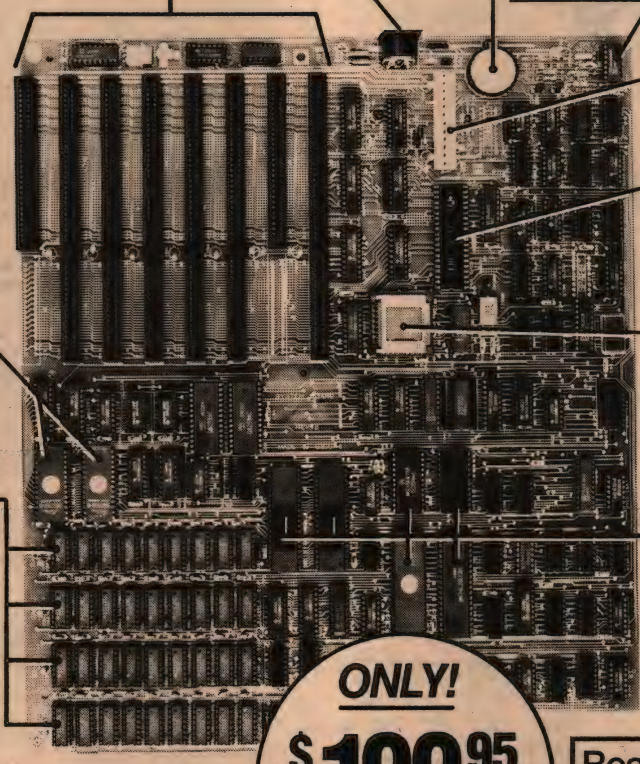

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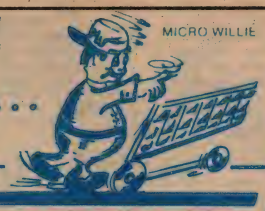

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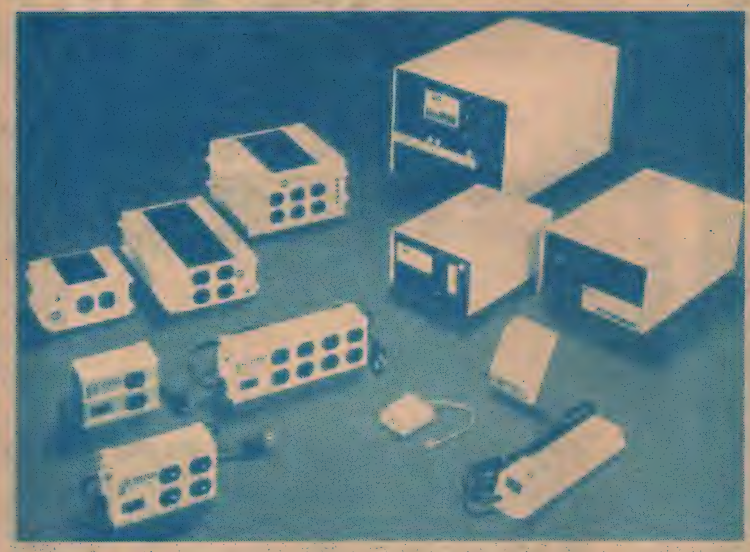

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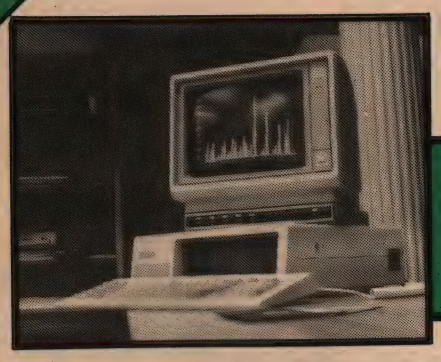

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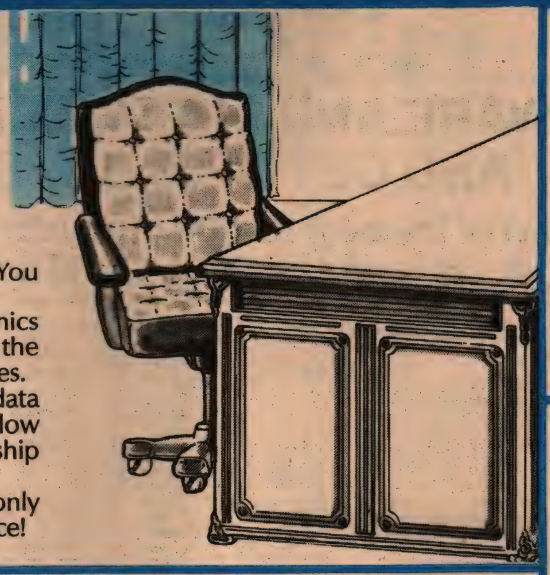

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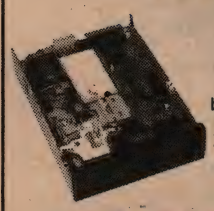

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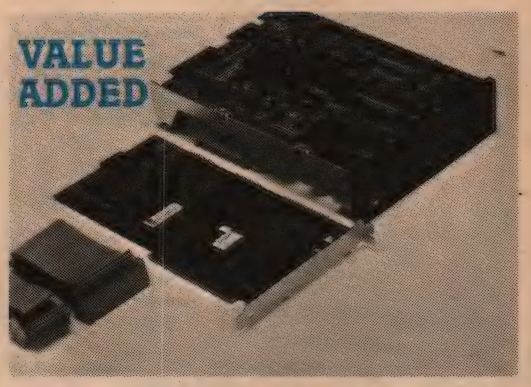

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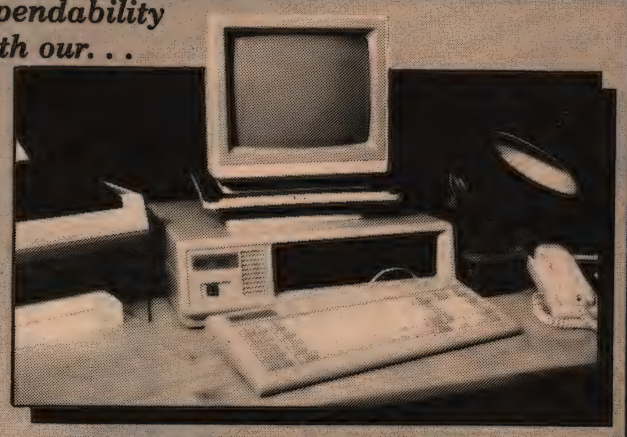

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From "C" to Shining Sea

by Andrew M. Fried

In the early days of microcomputing, limited memory coupled with slow processors resulted in many a program being crafted in assembly language. For the software developers, this was slow, costly and tedious. Back in those "prehistoric" days, existing high level languages suffered three major drawbacks; they consumed large amounts of memory, their execution speed was much slower than assembly language programs and they contained little or no support for low level hardware manipulation.

New technology solved some of the speed and memory problems. Rapidly dropping chip prices now make memory readily available for a fraction of what it used to cost. Memory availability is no longer a major problem.

A new concern of the software developers was how to port their programs, some of which were now being written in high level languages, to various systems without the need to provide complete rewrites.

What was needed was a high level language which offered a substantial degree of portability while at the same time presenting low level functions in a non-machine specific manner. The C programming language fit the bill.

Today, C has become one of the main languages for professional software developers in the PC-DOS arena. Most software houses now rely on C heavily; a fact easily observed in employment advertisements asking for programmers experienced with C. Microsoft wrote their Macro Assembler in "C". Ashton Tate wrote dBase III in C. Micropro wrote Wordstar 2000 in C. And the list goes on.

Since it's quite impossible to gain knowledge of C after reading only one article, I'll try to present its strong points and familiarize you with some of its features. For a technical perspective on C, I suggest you consider purchasing the bible for C programming, a book written by Kernighan and Ritchie called, *The C Programming Language*.

Background

Lets begin by taking a quick perspective of the development of the language. The C programming language did not develop overnight; it is part of an evolutionary process begun in the late sixties. Many of the concepts used in the creation of the C programming language were indirectly based on another computer language developed by Martin Richards which was called "BCPL."

Another computer scientist named Ken Thompson took many of the concepts found in BCPL and incorporated them into another programming language called "B."Developed in 1970, "B" was the first language written for the first Unix system which was based on a DEC PDP-7.

Finally, Dennis Ritchie, a computer scientist working at the Bell Laboratories, developed "C" which was designed and implemented on the Unix operating system on a DEC PDP-11. Interestingly enough, the Unix operating system, the C compiler and most of the applications running under Unix are developed and written using the C programming language.

To give you a feel for how powerful C is, according to the Kernighan and Ritchie book the Unix operating system consists of approximately 13,000 lines of C language code while only approximately 800 lines had to be coded in assembly language.

Today, the Unix operating system is running on machines from the largest mainframes down to the desktop microcomputer. C compilers are readily available for virtually every machine on the market as well as many prototypes barely off of the drawing board.

A Low Level Language

One misunderstanding about C should be stated up front, and that is that C is not a high level language. While C does contain several characteristic commands found in many high level languages, C more closely resembles generic assembly language.

The language itself is fairly small; the strength and utility of C arises from an extensive and standardized library of functions designed to perform everything from memory management to displaying text on the screen.

Because of this low level of operation, C is able to work with very minute details of the operating system completely shielded by the other high level languages. For instance, there is extensive support for bit twiddling, logical operations and recursion (where a function calls itself).

continued on page 108

Modula-2: A High Level Language For Systems Design

by Dave McMillen

As a former undergraduate student in computer science, I have been exposed to a wide range of programming languages such as Pascal, C, Assembly, Fortran, Modula-2, LISP, Cobol, and of course, BASIC. Out of the high level languages in this group, I consider Modula-2 to be the best overall programming language available today. Today's market doesn't tend to reflect my opinion though. It seems that everyone is jumping on the C bandwagon without even evaluating this powerful language known as Modula-2. The following article is intended to enlighten the reader of several of the main advantages of Modula-2 that don't exist in other high-level languages.

History

The language Modula-2 was designed in 1977 by Niklaus Wirth, the developer of Pascal. It originated from a research project at the Institut fur Informatik of ETH Zurich that Wirth helped develop. The goal of the project was to design a machine that was based entirely on a high level language. This meant designing a machine that could support high-level systems design as well as low-level programming that could interact with the associated hardware. Modula-2 became the language that could do both.

Main Advantages

Modula-2 incorporates several aspects that make it superior to Pascal as well as many other high-level languages. They are modularity and low level capabilities.

continued on page 68

Productivity Software for IBM & MSDOS

by Dr. Michael W. Ecker

The Norton Commander

Peter Norton has become something of a legend in the world of personal computing. So, when Peter Norton Computing, Inc., announces a new product, the world listens.

And what if the product wasn't actually written by the maestro himself? No matter, for if it bears the imprimatur of the man behind the Norton Utilities with its Unerase feature, then people may well assume that that's good enough.

This review of the Norton Commander, conducted on a 384K Tandy 1000 with two floppy drives (no hard disk), will see whether such an assumption is warranted.

The Norton Commander: The Metaphor, and What NC Really Is

The idea behind the name of this product, written independently by John Socha (but marketed by Norton), is that the waters of DOS are fierce and dangerous. Fraught with peril, we need a life preserver, we are told. We need to navigate the waters safely. And what will do this? (Do I have to ask?) Why, the Norton Commander, or NC for short.

Public relations hype aside, the $75 product for MSDOS computers *does* offer assistance to users of programs executed at the DOS level (typically, the A> prompt). But what is it?

Although I never once saw the phrase used in the manual, advertising, or elsewhere, after a few hours of experimentation, I remain persuaded that the Norton Commander is of a class of programs known as DOS shells. I can only guess that this term was studiously avoided to forestall comparisons with competitive products, and more important, to make people unaware that there even exist competitive products.

A DOS shell is a program which allows implementation of DOS commands, such as formatting, copying files or entire disks, and executing programs. Typically, rather than type in commands such as "Diskcopy A: B:" followed by a carriage return, one selects the Diskcopy choice from a menu by pointing and selecting, with windows to the files. The Commander does this. In general, as with other programs, there are two routes, or approaches, possible for such shells: menu-driven, and command-driven. By "menu-driven" one means that one is presented a menu and points with arrow keys, or uses initial letters, to select the desired choice of command. By "command-driven" one means that one types a few keystrokes—often summarized on reference cards, but not on screen (other than help menus)—to achieve such ends.

Commander is a hybrid of the two approaches. Although it does not necessarily lean toward the command-driven, the time it took me to get going with the program made it seem that way. As a matter of bias, I feel strongly that a DOS shell necessarily ought to be as menu-driven as possible. (After all, the general idea is to augment the operating system to make things easier.) One or two competitive programs that I took a quick look at seemed to be more menu-oriented, and that seems the way to go. As an example, I have in mind DOS-EASE from Soft Solutions.

Other than that concern about ease of learning, I found the Norton Commander to be, err..., a seaworthy product. It was clear that hard disk users, however, would be the greatest beneficiaries of the improved navigation.

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Microport Breaks The Price Barrier On UNIX System V For The IBM PC-AT

For the first time, a full version of UNIX System V containing over 200 utility programs is available for the IBM PC-AT at a price level comparable with DOS. Mocroport's new UNIX system for the IBM PC-AT is called System V/AT (System 5/AT) and is available for $159.00. System V/AT turns an IBM PC-AT or compatible into a multiuser, multitasking computer. Microport is also making System V/AT source code and unlimited site licensing available to educational institutions for a fee of $800.00.

Microport can offer System V/AT for $159.00 because it is based on AT&T's certified release developed by Intel known as UNIX System V Release 2 iAPX286 Version 1. "By starting with the certified release we can provide a product of the highest quality at a substantial cost savings, because the development of the standard product was funded by AT&T. Until now users would have to spend over a thousand dollars to buy a version of the UNIX operating system. This high cost has also deterred software vendors from porting their applications to UNIX, as the system cost adds to the price of their software. With System V/AT priced at a level that any user can afford, its rich set of utilities and software development tools make the product an excellent application package in its own right. It is also notable that System V/AT is inexpensive enough that manufacturers can economically bundle it with low cost computer systems, application software, and even peripherals," said Chuck Hickey, Microport's president.

On Microport's innovative educational site licensing program, Mr. Hickey added: For the first time Universities can place on every student's desk a PC-AT based UNIX development environment that will actually allow each student to modify the UNIX kernal source code. This product is unmatched for software development since all of the compilers and other software development tools run on the VAX as cross development programs as well as on the PC-AT." To participate in this program educational institutions must first obtain a UNIX System V/286 source code license from AT&T for a nominal fee.

System V/AT is a full adaptation of AT&T's UNIX System V Release 2 iAPX286 Version 1 and includes a number of commercial enhancements not found on other UNIX implementations. These features include Multiconsole, a virtual screen windowing system, dynamic disk buffer allocation for RAM disk performance, "File System Hardening" which greatly reduces the chance of data loss in the event of a power failure, and several U.C. Berkeley programs. Other features include SDB (a symbolic debugger), Fortran 77, small and large model C compilers, record level locking, and utilities to read and write DOS diskettes. "As a direct adaptation of the certified version, System V/AT contains all of the advanced features present in System V Release 2, and in fact is binary compatible with the AT&T PC 6300 Plus UNIX operating system. As an added benefit this compatibility allows Microport to upgrade virtually overnight to AT&T's UNIX System V Release 3 versions for the 286 and 386 when available," said Dwight Leu, product engineering director.

System V/AT is available in three packages: The Runtime System, which is priced at $159.00, The Software Development System, which is priced at $169.00, and the Text Processing System at $169.00. The complete package containing all three packages is available for $439.00. Microport also sells System V for the Intel 310 computers and 286 cross development tools for the DEC VAX computers.

For more information contact Microport Systems Incorporated, 10096 Soquel Drive, Aptos, CA. 95003; (408) 688-0286.

Mention that you read about it in *Computer Shopper*. ●

Modula-2 continued from page 67

Modularity

As one might expect, Modula-2 stands for modularity. I feel this is the best feature of the language. A Modula-2 program is made up of one or more separately compiled modules with the main routine being the main module. You might argue that you can already do this with several languages such as C and certain implementations of Pascal. Modules in this aspect, though, are just collections of procedures and functions compiled separately from the main program routine.

In Modula-2, each module is similar to a Pascal program in that it contains a constant, type, variable, procedure declaration section and a program section. The program can be thought of as an initialization procedure. A Modula-2 program is loaded module by module with the main module begin loaded last. After a module is loaded, the program section is executed, therefore instructions can be put here to initialize a module's global variables, etc.

As mentioned earlier, a program consists of one or more modules. In Modula-2 there are basically two types of modules, program modules and subsidiary of library modules. The program module contains the main routine of a program. A subsidiary module may contain frequently used procedures, data types, constants, etc. that the program module might use. The basic idea is that the main program routine, contained in the program module, references procedures, variables, constants, etc. contained in subsidiary modules. The way the program module gains access to objects in other modules is by "importing" them via an import list located at the beginning of the program module. The following is an example of two import lists:

```
IMPORT proc1 FROM ModuleA;
IMPORT Var_c FROM ModuleB;
```

One more thing must be done, though, before an object can actually be imported by the program module. The object to be imported must be "exported" by the subsidiary module. This is accomplished via an export list contained in the subsidiary module. The following is an example of an export list:

```
EXPORT Proc1;
EXPORT MyType;
```

If an object in a subsidiary module is not exported via its export list, the object can only be referenced by the module in which it is contained. This allows the author of a module to keep information "hidden" from users of his module. Information hiding is a useful concept in computer science and can be accomplished very nicely in Modula-2.

Further must be said about a subsidiary module. A subsidiary actually consists of two parts, a definition part and an implementation part. The definition part contains export lists along with declarations of the objects that are being exported. The implementation part contains the actual code of a subsidiary module. Each part is compiled separately and, therefore, is called a compilation unit. An importer of objects in another module needs only to have the definition part of that module since it contains all the necessary export information. Therefore, the implementation part can be kept "hidden" from users of the module. Since each part is compiled separately, a change made by the author of a module need not be reported to the users of his module. With this idea in mind, a user of a module need not be concerned with the method of implementation of an imported module; he can therefore concentrate entirely on the design of his module. System design in this case becomes increasingly easier.

Listing 1 shows an example of a program module and an implementation module. As you can tell by its title, program module Main is the main routine. 'MODULE' is the key word that identifies a program module. By Main's import list, we can see that it imports two objects from module ModA, a procedure named Proc1 and a data type called My_Rec. Although the names of the items that are to be imported give a hint of its type, you can't really tell if an imported item is a procedure or a data type until you look at the particular declaration of that object in the definition part of its containing module. The definition part of ModA exports Proc1 and My_Rec, making them available to other modules. A look at the implementation part of ModA shows that it also imports two items, those being Read and WriteLn from module InOut. InOut is a standard Modula-2 library module that contains several input and output procedures. Therefore, this example shows that subsidiary modules can import objects as well as export them. The program module, however, is only allowed to import items. A close look at the implementation part of ModA reveals a procedure, Hidden, that is not in the export list. This means that only ModA can make reference to Hidden and the procedure remains "hidden" from outside of the module.

Low-Level Facilities and Concurrency

Modula-2 incorporates several low-level facilities that make systems programming and bit twiddling possible. One such facility is type transfer functions. This allows an expression of one data type to be converted into another. For example, if exp is a CARDINAL (Modula-2 data type that represents natural numbers and 0) expression, INTEGER(exp) converts the expression to a type of INTEGER. Two machine dependent data types exist in Modula-2, WORD and ADDRESS. A WORD is one individually addressable unit in a computer's memory. An ADDRESS is a pointer to a WORD. Therefore, with these two types, you can get to the lowest level in a machine.

Several procedures such as NEWPROCESS and STARTPROCCESS allows for the creation and execution of process in Modula-2. Procedure NEWPROCESS creates a pro-

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LISTING 1:

```
MODULE Main;

FROM ModA IMPORT Proc1, My_Rec;

BEGIN { main routine }
  *
  *
  *
END Main. { end main routine }

DEFINITION MODULE ModA;

EXPORT Proc1, My_Rec;

TYPE
  My_Rec = RECORD
             *
             *
           END;

PROCEDURE Proc1 ( parameter list );

END ModA. { end of definition part }

IMPLEMENTATION MODULE ModA;

FROM InOut IMPORT Read, WriteLn;

PROCEDURE Proc1 ( parameter list );

BEGIN { Proc1 }
  *
  *
END Proc1;

PROCEDURE Hidden ( parameter list );

BEGIN { Hidden }
  *
  *
END Hidden;

BEGIN { initialization of ModA }
  *
  *
  *
END ModA.
```

ROBOTICS

Anatomy Of A Robot– Hero 2000

by Les Solomon

In the summer of 1982, I received an invitation to go to Benton Harbor to learn about Heath/Zenith's new robot. As Technical Director of *Popular Electronics Magazine* I had many experiences with Heath equipment and I looked forward to meeting Hero, their new development in Robotics. I spent about a week at Heath, learning all about the robot and the Heath Robotics Course that went with it. The result was the cover story for *Computers & Electronics Magazine* which appeared in the first issue of that magazine, dated January 1983.

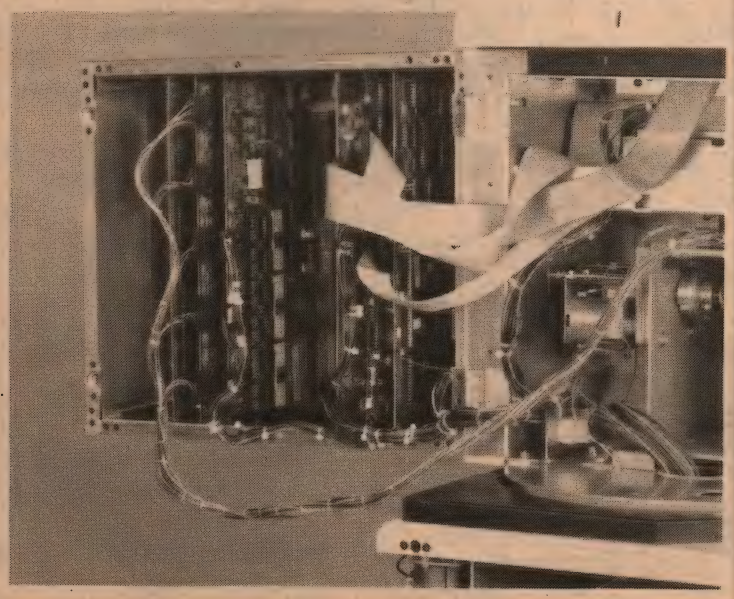
It is now 1986 and *Computer Shopper* is starting a new improvement program with this issue featuring the new slick cover and improved printing and binding. It is therefore more than a coincidence that I am writing the cover story for *Computer Shopper* about Hero 2000, grand-robot of the original Hero.

Hero 2000 is a bit taller than his ancestor and consists of three main assemblies, a mobile base, a torso and a head. Although the arm is an option that connects to the torso, it is hard to imagine that anyone will buy Hero 2000 without this essential part, frankly you wouldn't have much of a robot without it. The base unit contains the two propulsion motors and a single motor to rotate the torso. It also holds the main DC battery source, a 12-volt, 24 amp/hour sealed lead-acid battery, recharged by an external charger in 4 to 6 hours. The external charger also has a unique "docking package" that allows the robot to plug itself in for a life-giving "meal" of electrical power.

The main control assemblies and the card cage for the circuit boards comprise the main part of the torso section. The arm is a mechanical manipulator that is mounted on the front of the torso. It is designed to simulate the movements of a human arm and has five axes of movement (called "degrees of freedom," in robot jargon) shoulder movement, elbow movement, wrist pivot, wrist rotate and hand gripper. Torso rotation is considered another degree of freedom.

While the arm is only capable of moving an object with a one pound payload, it serves to teach about the operation of robotic arms. The arm can rotate from 0 degrees straight up to 120 degrees, the elbow can rotate from 0-degrees straight up to +180 degrees, the wrist can pivot from −90 degrees to +180 degrees and rotate from −179 degrees to +180 degrees. The robotic controls sense the arm movements in 10 discrete steps for control purposes.

The gripper (hand) opens to a maximum width of 4.375-inches in 9 steps, this is enough to grasp an object of 1 lb, which is the maximum weight that Hero 2000's arm can handle. The gripper closes with a force of 3¾ lbs so it can positively grab an object from a stack.



Inside Card Cage

While the capacity of the arm and gripper are not impressive, they are designed as a teaching tool rather than an industrial end effector assembly.

One of the things that separates Hero 2000 from the toys is its sensor package. This enables Hero 2000 to know where it is and what it is doing. Without these senses, control is meaningless. The motor sensors in each of the closed-loop DC servo drive motors feeds information back to a slave 8042 UPI Controller microprocessor allowing the robot to "know" where it is and what the motors are doing at all times. Hero 2000 has two sonar transducers, one mounted in the base points straight ahead, the other mounted on top of the head, rotates 360 degrees scanning the area. The sonar sensors cover a range of ten feet. Other sensors include a light detector that also scans through 360 de-

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Rear Card Cage of Hero 2000 opens for service.

Probots And People — But What Can They Do?

by Tim Knight

The two questions I hear most frequently at my store are "What's a Robot Center?" and "What can your robots do?" The first question I usually answer with a roll of the eyes, but the latter requires a bit more thought. When the first personal robot manufacturers were asked what their robots could do, they answered with hemming, hawwing, and plenty of "one day our robot will be able to..." and "add-ons are in the works that will..." Some people will lie outright and claim their robots can do "anything you want them to do" or "will cook your meals, clean the house, and wash your windows." The real answer to the question "What can they do?" is simple: not much. The more exciting thing to consider is "What will they be able to do?," to which I would reply: plenty!

Uses Today

Granted, personal robots today can't do much. They can be entertaining at parties by delivering drinks and snacks and "talking" by means of your speaking into the remote control. I would imagine, however, that after a few parties not too many of your guests would get excited when you asked, "Hey, I've got a great idea — how about I get out the Omnibot 2000 for a few laughs?" However, the potential of entertainment robots is great indeed when you consider the possible uses in interactive games and robots with truly independent personalities and "intelligence."

Personal robots are also being used today to guard homes. These sentries, however, are a little expensive for what you are getting. For example, the Hero Jr. costs $1,295 and uses its motion detector to sense if an intruder is present in the house. If motion is detected, the robot says "Intruder! You have five seconds to give me the correct password!" If you are the owner, you can simply clap your hands a specified number of times to get the robot to say "Alert aborted. You may pass, friend." If a person doesn't know what to do (such as a robber), the Hero Jr. will begin sounding off a very loud noise and will say in as loud a voice as it can muster, "Intruder alert!" There are a number of problems, though: the burglar could kick the hell out of the Hero Jr., and you'd wind up with a broken robot and a robbed home; the burglar could also simply turn the robot off or steal it along with all of your other possessions before you heard the alert signal. Robot manufacturers are trying to get around this problem by hooking up their robots to alarm systems and installing sophisticated password devices so that the robot cannot be turned off or tricked unless the owner is actually present. However, there's still one major problem with this application: why spend thousands of dollars on a ques-

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Robot Hero 2000 continued from page 69

grees and both sound and temperature detectors. Thus Hero 2000 is made aware of the environment around it. The information is collected and processed by the on-board microprocessor.

Hero 2000 can respond to the environment both through movement and speech. The built-in speech synthesizer enables Hero 2000 to communicate with an unlimited vocabulary of almost-human speech, four octaves of music and various special sound effects. There is also a direct text-to-speech capability which enables the operator to program the robot's speech merely by typing what the robot is to say from the remote console.

Hero BASIC Language

Hero BASIC is an interpretive form of BASIC enhanced by the additon of specific robot commands listed in Table I.

Unlike previous robots that worked only with a built-in stored program or with a relatively short cable connected as an umbilical cord, the Hero 2000 can be programmed either from its internal keyboard, an external RS-232 terminal, or via an RF link (operating at 75MHz) from the Heath Remote Control. Since the Remote Control has its own keyboard and LCD alphanumeric display, it can also function as an independent RS-232 terminal or can interface the robot with an external computer via the RF link.

Programs stored within the robot can be saved on a conventional cassette recorder using the cassette port provided on the robot.

Heath also provides a plug-in experimenters card that allows the more experienced robot user to try out his or her own hardware ideas.

For those wanting to put their Hero 2000 through its paces prior to programming, Heath has provided the Model ET-19-51 Demo ROM package.

When "called," this ROM provides eleven programs designed to demonstrate the robot's voice synthesizer and sensor capabilities.

These include:

1. Simulation of a grandfather's clock by saying "tick-tock." "Bonging" the Westminister chimes on each quarter hour and "bonging" the hour on the hour.

2. Act as an alarm clock by announcing the specified time.

3. Sing a portion of "Laura's Theme" and play the theme several times with different voices.

4. Appear to carry on a conversation by listening for a few moments then make some seemingly appropriate comment.

5. Fall asleep when left quietly alone. When you speak to the robot, the "Voice" LED will turn on as Hero awakes.

6. Create Baroque-style music to the beat of its own metronome.

7. Count and display (on its LED readouts), handclaps, toe-taps, etc.

8. "Sneezes" and seem to have caught cold.

9. Sing the alphabet song and display the words.

10. Demonstrate the directional light sensor by announcing the bearing to the nearest bright light in the room.

11. Try to make you feel "cooler" on a hot day by sonically imitating a blowing wind.

A documented Hero BASIC demonstration is also provided in the ROM manual.

As shown in Figure 1, the Hero 2000 consists of three main sections: the base, the torso, the arm, and the head. The optional arm is connected to the torso.

The base carries the two propulsion and single torso drive motors and the main dc battery power source. The battery is a sealed lead-acid type that is maintained by an external charger. It runs at 12 volts, 24 Ah and has a dual mode (13.8/14.5 volt) charge voltage at 5 Ah. Charge time is 7 hours and operating time is typically 4 to 6 hours.

Detectors are provided for low voltage and full charge with the sleep control shutting down the main supply.

The external charger provides + 19.2 volts at 5 amperes and has an optional "docking" package.

The various drive motors are controlled by an UPI (Universal Peripheral Interface) operating at 12MHz, with each channel using pulse-width modulation. The motors operate at 12 volts dc at a 8 amperes maximum per motor. All motor systems features speed regulation, position seeking, position tracking, and self initializing.

The torso carries the bulk of the electronics packages as well as mounting the optional arm (and its associated electronics).

Robot Electronics

The block diagram of Hero 2000 is shown in Figure 1. A swing-out card cage (having 12 slots) located at the rear of the torso mounts the various computer plug-in cards including an optional experimenters board.

Also mounted here is the computer consisting of an 1APX88/10 (8088) CPU operating at 5MHz. Onboard memory consists of 64K of ROM carrying the operating system and Hero BASIC. The remainder of memory consists of 24K of RAM. The computer also includes an 8-level priority vector interrupt controlled by an 8259A, and has an 8253-5 programmable timer.

To relieve the main 8088 CPU from the many time-consuming I/O operations necessary within a robot, eleven 8042 UPI (Universal Peripheral Interface)—each having its own (Arithmetic Logic Unit) ALU, operating algorithm in ROM, and some scratchpad RAM—are used. Communication between the CPU and the various UPI is in machine language. If you are an experienced programmer, this allows you to write assembly language in addition to BASIC programs.

One UPI is used as a real-time clock which also controls robot "sleep" time and interfaces to the robot's keyboard and display. Another UPI generates the ultrasonic sonar pulses and develops the sonar range data. One more UPI handles all the protocol for the RF link to the remote console. Three UPI are used in the main motor control system. The last five UPI are used for controlling various elements of the arm.

The I/O section interfaces the robot with the operator. Sensors keep track of 255 levels of external sound, ambient temperatures between + 60 and + 90 F. 255 levels of external light at 24 bearings 15 degrees apart, and keeps an eye on the main battery voltage.

Communication between the robot and the operator can be via a pair of RS-232C serial ports having baud rates to 38.4 Kbaud while previously programmed data can be stored in an external cassette recorder

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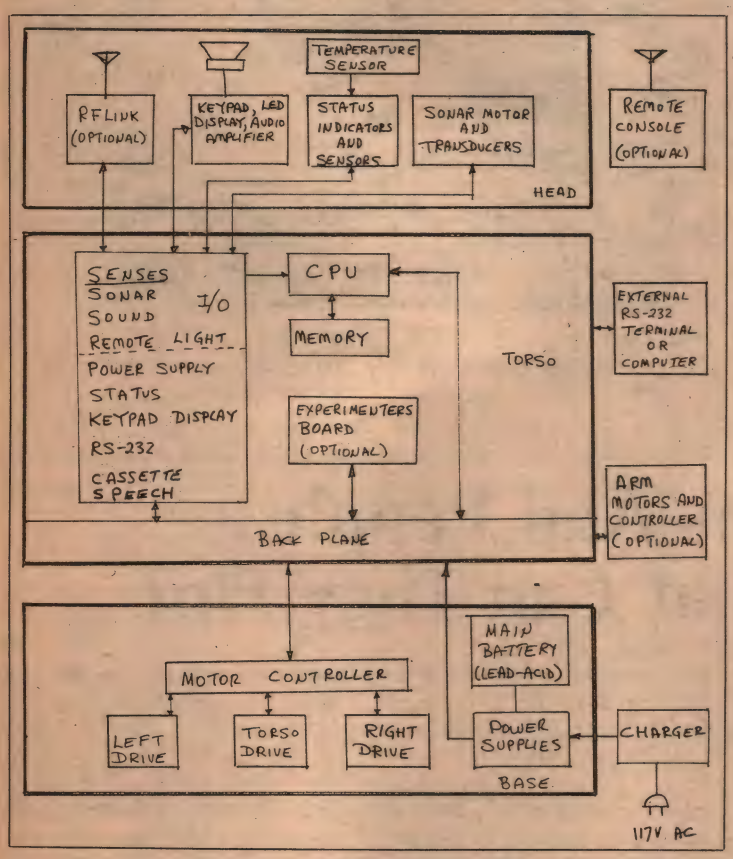

Figure 1

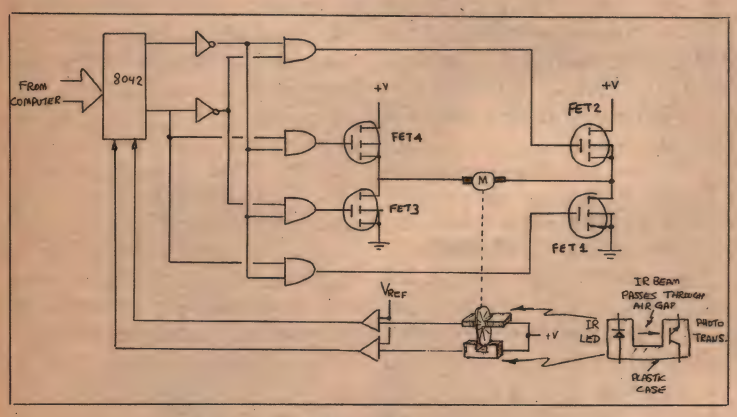

Figure 2

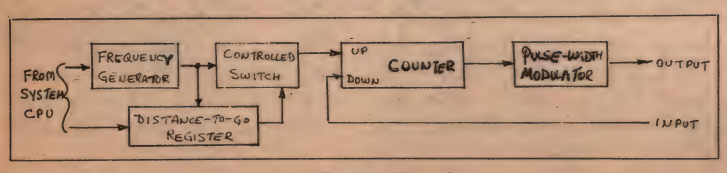

Figure 3

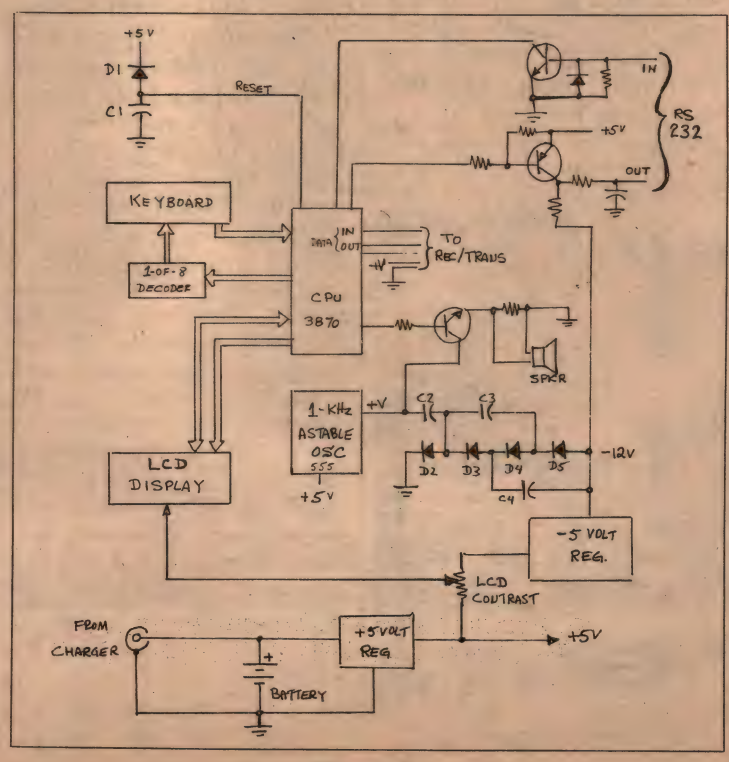

Figure 4

Table I. BASIC Robot Commands

ARM (degrees, speed)
BASE (distance, speed)
BATTERY (percent left)
ELBOW (position, speed)
FORCE (gripper open, close)
GRIP (amount open, close)
HOME (everything to stowed position)
LFT (left base motor, distance, speed)
LIGHT (ambient value)
MPOS(X) (position of motor X)
RHT (right base motor, distance, speed)
PITCH (wrist position, speed)
ROLL (rotate wrist)
SAY (robot speaks)
SLEEP (minutes, hours)
SONAR (target distance from head sensor)
SONARB (target distance from base sensor)
SOUND (sound level picked up)
SPEAK (a given phrase)
TEACH (instruct robot)
TEMP (ambient temperature)
TIME (minutes, hours, days)
TORSO (rotate degrees, speed)
WRIST (pitch, roll, speed)

COMMODORE

Commodore Introduces Low-Cost 64C Computer

by Stan Veit

Commodore has replaced the C-64 with a new low cost model designated the 64C. This new machine is actually a C-128 with 64K of RAM removed and a C-64 type keyboard in place of the C-128. Actually this makes sense for Commodore, having made the C-128 compatible with the older computer, it hardly pays to maintain two production lines.

As far as the user is concerned there is little difference because the old and new machines are operationally identical. The selling price is expected to remain about the same. The 64C is newer looking with the "wedge-shaped" look and will give the marketing people something new to sell. As a compliment to the computer style change there is a "new" disk drive, which is a re-styled 1541 with rounded corners. Internally, the 1541C has some board grade improvements but essentially it is identical to the older units.

To complete the new low-end computer system, Commodore now has the 1802 Monitor styled to go with the 64C system. This monitor is normally a 40 column color display, but it can be used with the C-128 for monochrome 80 column display.

The most important part of the new Commodore releases for the first time computer user is the ability of the 64C to use GEOS, (Graphic Environment Operating System). GEOS is bundled with the 64C system and provides all the desk top features associated with graphically oriented software systems. This includes, icons, pull-down menus, dialogue boxes and most importantly, bit-mapped graphics. Unlike the normal C-64 DOS which resides in firmware on the 1541 disk drive, GEOS is loaded from a disk. It can therefore be used with any C-64 computer (or C-128 in C-64 mode) in addition to the 64C. The GEOS system will be available for $59.99 at Commodore dealers. GEOS comes bundled with two applications, GEOWRITE and GEOPAINT plus a set of utilities which include a notepad, alarm clock, calendar and calculator.

GEOWRITE is a word processing program that employs icons and a mouse or joystick to enable users to edit, move text, or delete text by merely directing the pointer and pressing the button. GEOWRITE can insert footnotes, choose fonts or type sizes, move to selected pages or perform complicated word processing functions in a very simple direct manner. A variety of type fonts and sizes are available in-

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New Commodore 64C

1541 Disk Drive

GEOS Makes C-64 Look Like An Amiga

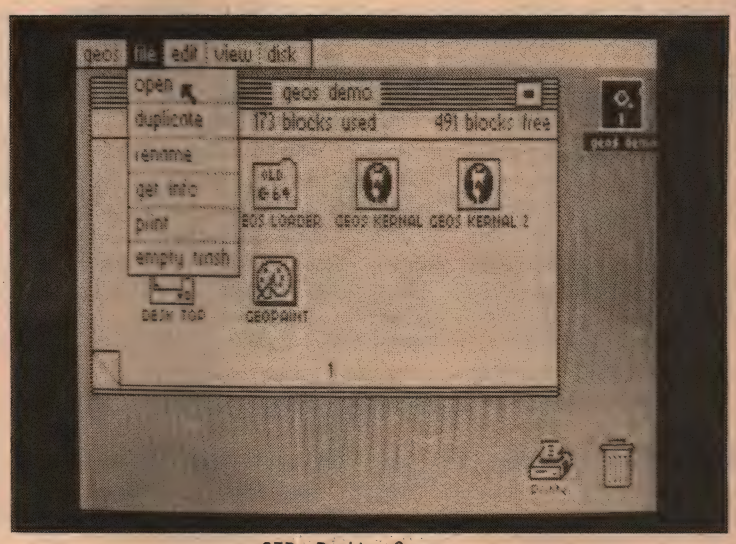
by Cheryl Peterson

GEOS (Graphics Oriented Operating System) is one of the more revolutionary products created for the C-64 and 64C. It simulates the environment used by Commodore Amiga, Atari 520ST and an Apple Macintosh. Icons and pull down menus control most of the operating system functions. While GEOS doesn't have a real multi-tasking capability, one is simulated by the use of overlays.

GEOS, comes with a built-in word processor and drawing program; GEOWRITE and GEOPAINT, while executing these programs you may use all of the desk accessories provided. These include an alarm clock, a calculator, a notepad, a photo album, a text album and a preferences accessory to set some of the screen parameters.

Of course, the Commodore 64 doesn't come with a mouse and most users have joysticks, so the program is controlled via joystick. An arrow represents the cursor's position. This cursor is used to point at icons and choices in menus. A menu bar at the top of the screen contains the options to manipulate files and screen activities.

Though it simulates the Amiga and ST screens, the program doesn't really have the feel of the "big boys." When an icon is chosen, you can click twice on the joystick to activate it, but to drag it around on the screen you must click once, wait a second and click again, then the item can be dragged over to the printer icon, trash can or elsewhere.



GEDs Desktop Screen

GEOS pull down menus feel entirely different, as well. Click once on the menu you want to pull down. Once it drops, you move the cursor down the choices. They do not highlight as you go. When you get to the one you want, you must click it on again. On other systems you click once, continue holding the button until you highlight your choice and let the button go when you are on the right choice. Though it seems like a small difference to those used to an Amiga or ST, it's very disconcerting.

Another major difference is the trash can. On a Macintosh, for example, a trashed file is not thrown away until the end of the session, when the computer asks if you want to empty the trash. With GEOS, once it's in the trash, it's gone. No "Are you sure?"

All file maintenance is performed from the desktop. The files on the active disk drive are displayed as icons with names. Several pages may be needed to display all the files. Unlike the Macintosh system, the window on the screen cannot be sized to display more files. A turned corner at the bottom of the page is used to "turn the page."

A disk menu contains all the disk manipulations routines; format, opening, closing, copying and erasing a disk. Of course, there are the standard file manipulations; copy, rename, open, delete and print. Files may be copied on the same disk under another name or on a new disk. These work nothing at all like similar functions on a Mac, Amiga or Atari. You can copy a file by dragging its icon to the new disk and setting it down there. Whole disks cannot be copied in this way. Ah well, compromises must be made.

GEOWRITE

This is a nice little word processing program. The many fonts and sizes make it fun to work with. It functions very similar to MacWrite. Text is typed in. It will appear in

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Inside Commodore

by Ted Drude

Getting Started With Modems And BBSs

A modem is unlike any other computer peripheral. In a way, it makes you a member of a larger computer community by putting you into direct contact with many other users. It also gives you instant access to a larger body of knowledge than you knew previously existed.

This month, we'll see what it takes to connect your Commodore computer to the outside world, including a quick look at the various hardware and software pieces. We'll also look at what I consider to be one of the best resources to help with your computing problems: a local (or not so local) Bulletin Board System (BBS).

Along with our featured topic, we've also got some announcements, rumors, and the usual assortment of Commodore clatter to sort through.

Yikes! (The C-128 PRG is Here)

In the June column, I gave Bantam books a little dig about not getting the *C-128 Programmer's Reference Guide* (PRG) to market. As you probably know, we've got a lead time of several weeks between the time this article is written and when it shows up in print. After the June issue was already on the way out, Bantam finally released the C-128 PRG (as I blushed)!

Anyway, the C-128 PRG is excellent. Event though it's $21.95 retail, the book is essential for serious programming. The 700 + pages are very well written and each chapter is a gold mine of programming information. I've studied, with great interest, the sections on video and memory management.

One interesting fact revealed by the PRG is that the C-128's 80 column video chip bears more than a passing resemblance, from a programmer's viewpoint, to the 6545 CRT controller. The chip can control a bit map of 640 x 200 in non-interlaced modes and 600 x 400 in interlaced modes.

That means the 128, technically, has the same pixel resolution as machines like the Amiga, Atari ST, and IBM-PC. It's easy to imagine graphic software for the C-128, in the near future, that competes quite well with other machines. Also, the chip can be reprogrammed, theoretically, to output text in an 80 x 50 format (80 characters wide by 50 lines high). Might make for some interesting text window displays!

One thing missing from the C-128 PRG is the actual schematic diagram of the C-128, which was included in the VIC-20 and C-64 PRGs. There is a detailed block diagram of the system, and, technically speaking, that's all a programmer needs, but it's a small disappointment to hardware nuts like me. One explanation for the missing schematic is that Bantam was working on this book for several months and the C-128's motherboard went through a couple of revisions since then. Whatever the reason, for serious hardware hacking and service work, we may have to wait for the promised SAMS *ComputerFact* book.

Commodore Re-Affirms Commitment to C-64: Announces New C-64C

You may have been as surprised as I was to see the new C-64 model C. Until the Summer CES, Commodore hadn't shown this thing at any shows, and rumors about it had been very tight (although I did mention it briefly in my June column). The model C is the familiar old C-64 in a new C-128 looking case. But, the new case isn't exactly the C-128 case and the keyboard is still pretty much the same as the old one (rumors had it with the C-128's numeric pad).

The big news is that, with the C model, Commodore is now bundling their Quantumlink communication software (modem is still extra) and the innovative GEOS operating system. Enough has already been written about GEOS that I don't think I need to throw my two cents in. But, along with most of those who have reviewed it, I think GEOS will set a new software standard for the C-64. It will undoubtedly affect the C-128, too, when that version is done.

When you combine the power of GEOS with the new 512K RAM packs and hard disks coming on the market you have a machine that has plenty of power for the price. With hardware and software like this, C-64 owners don't have to throw away their investment to get graphic capability comparable to the Atari ST or Amiga.

The Hard Disks Are Coming...They're HERE!

Over the past months, we've

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The Amiga Workbench

by Ervin Bobo

Last month we promised to look at some of the best routines currently being hung out on bulletin boards and I've collected a dozen or so pieces of freeware and shareware.

Before getting to that, however, we should take a look at a new piece of software called Scribble!, for it represents the second word processor to be made available for the Amiga—the first was TextCraft—and the two are very different.

In spite of it's frivolous name, Scribble is a serious productivity tool; and so designed that it should appeal to the novice as well as the experi enced user. Though it makes full use of the mouse and pull-down menus, every feature of the program can also be accessed through keyboard commands, allowing those who prefer the latter method to achieve a little extra speed.

In fact, some key commands were deliberately patterned after those in WordStar, the idea being that the widespread use of that program will help to flatten the learning curve for many who now wish to do their work on the Amiga.

Because it resides on a Workbench disk, Scribble can be copied and can be installed on a hard disk—something we consider a must for any new productivity software.

Configured for the production of text files as well as word processing, Scribble insists on a few protocols that may not be familiar to everyone: In your Preferences printer setup, you should set your left margin at 0 and your right at 255. This keeps Preferences from interfering with the line length you will set in the program. Line length is the determination of your right margin—also an unfamiliar concept—as is "page offset," the device for setting your left margin.

In addition to these, Scribble allows you to print to disk. When you do this, your file is saved in the ASCII format and a carriage return/line feed is added to each line in the document. Those who have transferred files by modem will immediately appreciate this feature.

And those who do a lot of rewriting and revising will enjoy the ability to work on as many as four documents at once, depending on the size of the documents and the amount of memory in our Amiga. In doing this, documents can be "stacked" so that you see only the one on which you are working, or "tiered" so that you can see the tops of the underlying, inactive, pages. The option in Scribble that allows you to change "paper" and "ink" colors could be useful here to keep the confusing of documents to a minimum.

One of my favorite features, accessed from the pull-down Project menu, is Status. Click it on and a window opens in the center of the screen, showing you the current settings of page length, line length, page offset, character count, word count and remaining memory. Character count, quite obviously, is another feature designed to aid in telecommunications.

We've come to expect and even demand, Cut, Paste and Copy features in our word processors and they are here in Scribble, but with something extra added. In the event that you do work on two or more documents at the same time, it's nice to know that you can freely cut from one and paste into another, or copy a section from one file to another.

In saving or retrieving a document, you select Archive from the project menu. A requester window opens, showing you the documents on file and, if you have more than one drive, clicking on "DIR" allows you to specify the path to the correct directory.

Though it may be confusing at first, there is another Archive option in the Default menu. Default allows you to set the format for your document in terms of page length, line length, justification, etc., and this Archive allows you to store the form—not the document itself—in a subdirectory. In this way, it is possible to have several forms on file and simply click on the one most

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MiAmiga File—A Database For The Amiga

by Ronald Bobo

Among programs which have appeared recently for the Amiga computer is MiAmiga File, a database with some novel touches. While not a full-fledged relational database such as dBase III, MiAmiga File does fill a niche in the Amiga community.

The distribution disk is not copy protected. SoftWood even goes so far as to tell the purchaser, in the copyright notice, that all of the material purchased may be sold, given or loaned to another person, along with all backup copies. Just don't make a copy for someone else! Since it is rare for software companies to be this trusting, please do not abuse the privilege.

A disclaimer in the front of the manual goes to the other extreme with the usual nonsense, guaranteeing that the program is not warranted to do anything at all and, if it does, SoftWood will not be responsible for any consequences therefrom. Furthermore, should the program prove defective after purchase, the buyer is responsible for the entire cost of any necessary damages!

Well, I wouldn't worry too much about that one. The program did do everything it was supposed to do during my tests, so the disclaimer can probably be attributed to a company lawyer earning his keep.

MiAmiga File is written in the C langauge and makes good use of the Amiga's special features such as pull-down menus, windows and mouse.

This program is an example of what is sometimes termed a "flat" database, i.e., only one file is open at any one time, files cannot be set in relation to one another, no programming is possible and there is no random access to file records.

File sizes are limited by available memory, since the

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APPLE

Ask The Guru

by Don Lancaster

Hats off to both the PFS Software people and to the crew at Dollars and Sense. Word has it that both these outfits have completely dropped all copy protection from their software.

Actually, more and more software houses are waking up to the obvious facts that copy protection (1) does not work, (2) hacks off users, (3) creates all sorts of hard disk hassles, (4) dramatically *increases* the number of bootleg copies in circulation, (5) diverts resources from useful tasks, (6) costs money, and inevitably, (7) loses sales.

If *you* are a software author, there's two key secrets to coping with bootlegging and piracy.

The first is to not sweat it, since actual cash lost out of your pocket is much, much smaller than you might imagine. Consider the average software "collector" or "trader" who has, say, only 10,000 bootleg programs in his primary trading stack.

Even if he stopped trading for a while and actually *used* one of his stolen programs, the chances are overwhelming it wouldn't be yours anyway.

The second anti-piracy measure is to include as much personal value added in your software products as possible. At the very least, this must include a free and courteous unlimited helpline service, a "no questions asked" return policy, and a $5 no-hassle exchange for blown or broken disks.

You should also concentrate on those parts of your package that are *not* on disk, such as tutorials, guides, or manuals, reference cards, use aides, and anything else that puts the perceived value of your product on the overall package rather than on disk.

For lots more on personal value added, check into my *Incredible Secret Money Machine* book.

Turning to other news, I keep hearing persistent rumors that future Apple products might not be compatible with devices that plug into the existing "slot zero" IIe memory expansion slot. Thus, third party "slot zero" memory expansion cards might not be usable after an upgrade.

A related rumor (and some plain old common sense) says that cards that plug into slots 1-7 might get into deep compatibility trouble unless they slavishly make exact use of the I/O SELECT and I/O STROBE lines. Should future address spaces end up wider than 16 bits, the partial decode done by some plug-in cards could cause all sorts of conflict and contention problems.

This might get very sticky on multifunction peripheral cards that do a "phantom slot" decoding.

On to this month's vast collection of goodies....

Where Do YOU Go For Technical Help?

Why, to the Gila Valley Apple Growers, of course. There is no finer collection of technical expertise available anywhere, ever.

Tellya what I'm gonna do. Figure 1 is my super secret list of where I go to get technical help.

Those people with (602) opcodes are charter members of the GVAGA; those without are honorary members but members nonetheless.

Most of these people are willing to listen to your help requests. Provided, of course, that you extend the usual courtesies in the same way that most of my helpline users already do.

Ferinstance, check the area code against the time zone, and never call before 8 am or after 9 pm *local time*. Remember that all California clocks are laid back.

Do not ask for or expect a return call, unless the tab is on you. Keep the call length under ten minutes max.

And, if the call is useful to you, pay for it somehow. Perhaps by buying one of their products, or by using one of their services. At the very least, lay some original software on them or send some local produce, nuts and berries, or whatever.

Play fair and everyone will win and win big.

How Can I Convert Decimal to ASCII?

There are lots of times and places in microcomputer software when you might like to convert a decimal value to its printable ASCII equivalent, and vice versa.

For instance, you might have the decimal score of a game stashed somewhere and you might want to route it to a video screen.

Or, you might want to show the number of characters already used or still available in a word processor.

Decimal numbers are usually represented by four bit bytes with 0000 = 0, 0001 = 1, 0010 = 2...up to 1001 = 9. One byte is used for each decimal decade. One 4-bit byte coded this way is called BCD, short for Binary Coded Decimal. Each byte holds one decimal digit.

Figure two shows us how to get between BCD decimal and ASCII, the standard character code.

The rules are simple: To get from BCD to ASCII, just add decimal 48 or hex $30. To get from ASCII to BDC, just subtract decimal 48 or hex $30. And that's all there is to it.

Sometimes, a pair of BCD bytes might be combined into

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0	0000	0011 0000	$30
1	0001	0011 0001	$31
2	0010	0011 0010	$32
3	0011	0011 0011	$33
4	0100	0011 0100	$34
5	0101	0011 0101	$35
6	0110	0011 0110	$36
7	0111	0011 0111	$37
8	1000	0011 1000	$38
9	1001	0011 1001	$39

Fig. 2 - Decimal and ASCII equivalents.

ACADEMIC COMPUTING:	
Ed Hunter	(602) 428-1133
ANIMATION:	
David Meyer Sr.	(801) 359-2790
APPLE II:	
Tom Weishaar	(913) 649-0567
APPLE III:	
Val Golding	(818) 708 2382
ASSEMBLY:	
Bob Sander-Cedarlof	(214) 324-2050
CABLE TV:	
Phil Nelson	(602) 428-1850
CLONES:	
Doug Trueman	(417) 679-4682
C PROGRAMMING:	
Henry Schneiker	(602) 881 2632
DISASSEMBLY:	
Bob Kovacs	(201) 325-1885
EPROMS:	
Bob Gardner	(206) 337-2370
IMAGE PROCESSING:	
Charlie Springer	(415) 322 7373
INTERFACE:	
John Bell	(415) 592-8411
MECHANISMS:	
Claude Martin	(602) 428-4830
OPTICS:	
Forrest Mims	(512) 372-0548
POSTSCRIPT:	
Doug Sleeter	(415) 852-0271
PROGRAMMING:	
Gary Crockett	(602) 428-3256
SIGNAL PROCESSING:	
Roger Cox	(303) 641-4240
SOLAR ENERGY:	
Jim Allen	(602) 428-6993
SPEECH SYNTHESIS:	
Bruce Fette	(602) 834-3370
WPL and APPLEWRITER:	
Don Thompson	(714) 855-3838
65808 and 65816:	
Will Troxel	(301) 987-6083

Fig. 1 - My super secret technical consultants list.

Modems For the Apple

by Philip Chien

One of the most popular, and powerful accessories for the small computer market is a modem. With a modem you can connect your computer to almost any other computer in the world. You can check up on stock market prices, transfer money in between banking accounts, pay bills, or even make an airplane reservation. If you are an author, you can even send your manuscript via modems. When Arthur C. Clark wrote his novel *2010: Odyssey Two*, he sent it to his New York publisher on a floppy diskette. The last second updates were sent via modem, and the Indian Ocean INTELSAT-V communications satellite. During the filming of the movie version, he kept in contact with the movie's screenplay writer Peter Hyams via modem. Each day the two authors sent the other messages via modem. The modem also neatly solved the time zone difference between Los Angeles and Sri Lanka. They kept copies of their messages and their "memoirs" were published (*The Odyssey File* Ballantine Books 1984).

So what do you need to use a modem? Besides a computer and telephone line you will need some kind of communications program. Your modem may include a built-in program, but in most cases you will probably want to get a separate communications package. The package may just be a simple program which emulates a dumb terminal, it may be a custom package designed only to retrive stock or commodity information, it may encrypt the data to protect it from hackers, it may be able to send or save information from your word processor, or any combination of the above.

Modems are serial devices. (In theory it would be possible to use eight different frequencies to send parallel data over phone lines, but voice quality phone lines don't have enough bandwidth to make it practical.) The Apple III and Apple IIc have built-in RS-232 serial ports, but other Apples will require an extra serial interface card. Apple IIc users generally have to use RS-232 modems, but a variety of different direct connect models are available for the Apple II and IIe. These modems will plug directly into the Apple's motherboard, and include their own built-in serial converters. Depending on the particular model, it may even emulate plugging a Super Serial card into your Apple, and attaching an external modem to it.

As a general rule, you can use your normal phone line for your modem with a simple modular Y-jack. Many modems even come with a Y-jack or extra modular jack to make it easier to use a modem with an existing phone line. If you use your modem a lot, you may wish to get a separate phone line just for modem use, or attach your modem to a secondary line. In several cases where I've set up nighttime bulletin boards for businesses the modem is attached to the credit card machine's phone line. During the night the phone line is dedicated to use by the modem. During the day the line is shared by the credit card verifier and the modem.

For legal reasons you cannot attach your modem to a party line, or to a pay phone. You should tell your local phone company that you are using an FCC registered device, and tell them your modem's ID numbers. Make sure that your phone line does NOT have call waiting. A call waiting click sounds like a hang up to most modems. You should get a phone line protector for your modem. If you search around, you can probably buy a modem protector for under $10. It's the best $10 you'll ever invest. Florida Power and Light (a/k/a Florida Flash and Flicker) probably has the worst short and lightning protection ever designed. A lightning strike almost delayed the launch of the eighteenth shuttle mission, and two of my modems were fried by lightning before I put a protector on the line. (It took me a while, but eventually I learned).

If you wish to use your modem for long distance, or international communications, thre are other factors which should concern you. Some modems can detect secondary dial tones (e.g. outside lines, long distance tones, etc.) but most modems can ony be instructed to wait for a period of time. If you do a lot of modem work long distance, a modem with a tone detect feature may be important. The transmission method used by your long distance service will also affect your modem's performance. Standard voice quality phone lines, microwave links, and fiber optic cables will all handle modems without any problems. Satellite linkups are a different story. The massive distances involved with satellite communications will cause delays with interactive applications. In full duplex mode your computer sends a character to the receiving computer. It then sends back the characater and when your computer receives it, it is displayed on your screen. With a statellite line the distances involved (45,000 mi 71,000 km) will result in your characaters being displayed about a half second AFTER you type them in.

If your modem plugs into the Apple's motherboard then your communications program will have to support it, and "talk" to it directly. Many programs assume that a modem is attached to a serial card and external port, and will not work with many internal modems on the Apple. If your computer attaches to a serial port then your program will have to send its commands as ASCII characters. Fortunately there is a defacto ASCII standard. In 1980 DC Hayes came out with their Smartmodem. The modem contains its own microprocessor and a very powerful command set. The command "AT," for attention, is used to instruct the Smartmodem. For example "AT D 9, T 555-1212" will instruct the modem to dial a "9," wait two seconds, and dial the phone number "555-1212" in Touch Tone mode. After the modem gets a carrier, it will respond with the text "CONNECT." Very quickly other manufacturers started using the Hayes's "AT" commands, and the Hayes format became a defacto standard. The standard is so pupular that many of the modems which plug directly into the Apple emulate a Super Serial card attached to a Smartmodem. In many advertisements you will see the phrase "Smartmodem compatible." Generally this means that the modem will respond to the Smartmodem's "AT" commands the Smartmodem has several stack registers, usually referred to as "S registers." These memory locations control various variables which control your modem's operation. Several modems which claim that they are "Smartmodem compatible" do not have all of the S registers, and are not truly totally Smartmodem compatible. Various ads will state that they use the AT commands and have all of the S registers. These modems should be totally software compatible with the Smartmodem.

There are hundreds of different modems available ranging from plain vanilla modems for as little as $19 to sophisticated top of the line models priced at over $3,000. So what's best?

Believe it or not, for many beginning modem users a plain vanilla 300 baud modem may be the best choice. 99.99% of all computer services will work at 300 baud. Those which also work at higher baud rates often charge more for the "privilege" of the faster access. In addition slower baud rates are more tollerant to errors than faster ones. If your phone line experiences a small glitch it will only affect one or two characters at 300 baud, but will mess up five or six characters at 1200 baud.

For quite a few uses faster baud rates may be wasted. Most people cannot read faster than 300 baud, so for interactive applications (e.g. playing a game or reading information as it comes off the screen) any higher baud rates are wasted.

An inexpensive 300 baud modem is a good way to "get your feet wet" and see if you really want to get into telecommunications before going all the way and spending a lot of money on a full blown top of the line modem. Many modem users which are "moving up" to higher baud rates sell their used 300 baud modems quite inexpensivly. As a bonus, most communications programs which you purchase for your 300 baud modem will also work with any higher speed, or more sophisticated modem you may purchase in the future.

A plain vanilla 300 baud modem is fine for getting your feet wet, but once you've found out that you like to use modems, how do you choose between the different Smartmodem compatible modems if they are all more or less fairly similar?

The first and most important modem feature is baud rate. Many modems will only work at 300 baud, but others will work at 300 and 1200 baud. A few new modems will also operate at 300, 1200, and 2400 baud. Naturally all other things being equal, the 300 baud modems are the least ex-

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Upgrading Kaypro CP/M

by Charles Barton

Let's face it CP/M 2.2 is outdated. CP/M may have been the best microcomputer operating system developed in the 1970s for the Intel 8080 chip, but this is 1986 and almost all CP/M computers in existence use the Z80. Using CP/M on a Z80 is like installing a 2 speed transmission in a Corvette. I'll tell you what I mean.

I am a writer. I bought a Kaypro 4 computer a couple of years ago because the minimum configuration for serious word processing requires 2 disk drives, 64k memory, and WordStar or similar quality word processing software. At the time Kaypro offered an unbeatable bargain. The original Kaypro 4 is, with suitable modifications, still first rate word processing equipment. As a writing tool, the Kaypro can actually be faster than an IBM PC. Since a used Kaypro with word processing software can be bought for around $500, the Kaypro still is one heck of a bargain. But then, as I say, there are those suitable modifications.

We have to start with the operating system. CP/M is actually a set of commands that let you do things with your system. But some of those commands are limited. If you are writing, you want your computer to do things quickly and competently. If your word processing program is on drive A, and your text file on drive B, it is faster to load them at the same time, if this is legal. (It isn't legal with WordStar.) But to load the two programs at the same time you have to use a command like this A>PW B:ALPHA,MSS. This works OK until you want to save something, then Oops, I saved it to drive A which already had 390K worth of files. Little slips like this can be disconcerting to a writer.

One problem for the CP/M user is the TYPE command. Have you tried to read a disk

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MACINTOSH

MacUniverse

by L.J. Kutten

Macintosh Plus Reset Switch Warning: If you have a Macintosh Plus and the unit has been crashing randomly, do not take it in for repairs without first removing your reset switch and see what happens. It appears that while the Macintosh and Macintosh Plus reset switches are identical the Macintosh and Macintosh Plus cases are not. The Plus case is a shade narrower and a number of people (including yours truly) have suffered all sorts of random errors caused by this slightly too big reset switch.

Moving Copy Protected Programs to 800K Disks: If you need to move copy protected programs to 800K disks try the following method. Take a hard disk installer program that recognizes Apple's HD20 (e.g. Copy II Mac Hard Disk Installer). Run the program but tell it to copy the program onto the 800K disk. After a few seconds of disk whirring the program will appear on the 800K disk. I do not know why this works but I think it does because an 800K disk looks like the Apple HD20 to the copy program.

Replace Your Battery Now: If you bought one of the early Macintoshes, it is now time to replace your old battery with a new one. You will need an Eveready No. 523 or the equivalent.

A True Low Life: I hate software pirates. In my book they are the lowest form of human being. They are even lower than companies that put copy protection on software (which is also pretty low). The lowest form of software pirates are the thieves who maintain bulletin boards with commercial software on them. But the lowest pirate I have ever had the displeasure to meet went one better. Not only does this pirate have the audacity to put such programs as Excel, Microsoft Word, and Flight Simulator on the board, but he/she/it goes one better by modifying each program so they will eventually crash. His/her/its rationale was that people would download the program, try it for a while, see it does not work, and then come into his/her/its store to buy a bug free copy.

As far as I am concerned this rational is twisted thinking. It assumes people, after trying a buggy copy, will think a legitimate copy will work better! I disagree. If someone loans me a copy of a program to evaluate and it crashes, I assume the bug is inherent in the program and I will not buy it. It takes a masochistic personality to buy a program that you know will not work.

Furthermore, this low life is threatening the future avail ability of new software. Most authors do not create commercial software for the fun of it. They expect to be paid. If they are not paid enough, they will not create new software.

Microsoft Word Patch: As much as I hate piracy, I also hate copy protection on non-game software. Too many times, I have found myself up the proverbial creek because my master disk died. Accord ingly I am passing along a patch I found to Microsoft Word 1.05 that eliminates the need for a "Master Disk." Merely search for the HEX string "DD6084BEDD" and change it to "DD4E71BEDD." This disables the routine that looks for the invisible, protected file, "Kensha Rutha."

At this point some readers will say I am being two faced since this patch may encourage diskette piracy and the previous section blasted software pirates. I think not. In the past four years I have noticed a change in the average computer user. Sure there is still a lot of piracy, but it is a lot less. People better understand their rights and obligations as software consumers. For example, very few user groups now condone any piracy occurring at their meetings and many coporations now have established anti-piracy issues (at some companies it is automatic termination to have pirated software.

Demographic Software for the Mac: If you need 1980 Census demographic information in a Macintosh environment take a look at "People in Places" software package by Data & Information Software. This program contains fifty sets of demographic statistics from the 1980 U.S. Census for 1000 metropolitan counties. The information can be presented three ways: (1) detailed lists to compare and review exact figures; (2) bar graphs to visualize relative values selected; and (3) maps scaled to show the geographies relationships. Currently People in Places is only available via mail order for $59.95.

Competition for Think Tank: It appears ThinkTank finally has some competition. MaxThink, Inc., has released its program MaxThink for the Macintosh. Previously avail able for the IBM PC, it is to

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Hard-Disk Storage Macintoshes, Apple IIs

Low-cost 10M- and 20M-byte hard-disk add-on subsystems designed for interchangeable use with Apple II and Macintosh desktop microcomputers have been announced by ProAPP Systems, Inc.

Available as either the ProAPP 10 (10M-bytes) or the ProAPP 20 (20M-bytes), the standalone subsystems allow Apple users to change or upgrade to different computers without re-investing in costly fixed-disk drives and controllers. Moving a ProAPP 10 or ProAPP 20 from one Apple machine to another is as simple as disconnecting the subsystem from the first computer and reconnecting it to the second using the appropriate cabling. An 8-pin DIP switch on the bottom of the device is then reconfigured.

The new subsystems comprise a drive, controller and port circuits in an attractive, off-white package. Power is delivered from an external power supply. The unit attaches to the floppy disk ports supported by the Apple IIe, the IIc portable computer and the earlier 128K and 512K Macintoshes, or to the higher speed Small Computer Systems Interface (SCSI) ports found on the newer Mac Plus.

"The key to the ProAPP subsystem is in its flexibility," said company president and founder Gary Streuter. "For example, if you have a hard disk attached to the floppy disk port of a 512K Mac and you upgrade to a new Mac Plus, you have a choice of buying a new hard disk and controller that could handle the higher speed SCSI port or attaching your existing drive to the Mac Plus slower floppy port. With a ProAPP subsystem, you can move the unit between different Apple models by changing the port being used and simply resetting the DIP switches."

In addition to adding high-performance data storage to a wide variety of Apple computers, use of a ProAPP 10 and 20 can also significantly improve the performance of older 8-bit machines, Streuter added. "These subsystems give owners of Apple IIe and IIc machines access to an SCSI port," he explained. "Data can be transferred to a ProAPP drive via the floppy ports, spooled and then output using the subsystem's SCSI port."

Incorporation of floppy and SCSI ports and the ability to partition the disk to accommodate different operating systems will also permit the ProAPP drive to function as a means to transfer text files between IIs and Macs, he added. The subsystem also includes a printer/spooler interface compatible with the Apple Image Writer.

Initial market focus for the new fixed disk drives will be the education market, according to Streuter. "This market has a tremendous appetite for data storage, a huge installed base of Apple machines, and an eye for low-cost, reliable hardware," he said.

The subsystems support the operating systems incorporated into the Mac 128 and 512 and the Mac Plus and provide full subdirectory support for Apple IIe and IIc machines running under ProDOS, Dos 3.3 or Pascal 1.3. Programs running under these operating systems can be booted from the ProAPP hard disk.

The ProAPP 10 is priced at $795; the ProAPP 20 at $995. Both are backed by a 12-month limited warranty and a 10-day money-back guarantee.

The ProAPP 10 and 20 can be ordered by calling 800-424-2425 or by writing ProAPP, 1475 South Bascom Avenue, Campbell, California 95008.

Mention that you read about it in *Computer Shopper*. ●

Hayes Adds New Features For The Apple Macintosh

Hayes Microcomputer Products, Inc. has released Smartcom II V2.2, upgrading its popular Apple Macintosh communications software to provide Option Key Autopilot sequences, Auto Startup sequences, and Received File naming capabilities. The program also supports the Macintosh Plus and the Hierarchical File System (HFS).

"The enhancements provide Macintosh users with the most versatile, feature-rich communications package available today," said Garry Betty, Vice president of sales for Hayes. "We listened to the comments of users of our original Smartcom II program for the Macintosh and feel this new version provides them with the capabilities they requested most often."

Smartcom II V2.2 supports the newly released Macintosh Plus and the Hierarchical File System. HFS compatibility improves file handling and organization for faster, more efficient access, update, and transfer. The enhanced program is compatible with all earlier models of the Apple Macintosh.

The new Option Key Autopilot sequence feature provides a "shortcut" for executing an Autopilot sequence. A single character identifier can be assigned to an Autopilot sequence and, when the identifier along with the option key is pressed, the sequence is executed.

In addition to an Auto Log-On sequence, each document can now contain an Auto Startup sequence that can be invoked from the desktop. This feature enables a user to proceed from the desktop, into Smartcom II, dial, log-on to another system, execute desired Autopilot sequences, and log-off, all with one double-click of the mouse. In fact, by selecting Smartcom II to run on start up this entire process can be accomplished simply by turning on the Macintosh.

This enhanced program allows the receiver to automatically name incoming files using the name assigned to the file by the sender or re-name the files as desired. Automatic naming of incoming files is especially beneficial for storing files received during unattended operation.

The software provides all features in the program's original release: interactive graphics, context sensitive help messages, terminal emulation, multiple protocols, and voice/data transmission. The software supports data transmission at 19,200 bps, 9600 bps, 2400 bps or 0-300 bps.

Estimated retail price for Smartcom II V2.2 for the Apple Macintosh is $149. Diskette and documentation upgrades may be obtained from Hayes Customer Service, 404/441-1617.

For additional information contact Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348; (404) 449-8791.

Mention that you read about it in *Computer Shopper*. ●

MacUniverse continued from page 75

ThinkTank what Word is to MacWrite. It is definitely the outliner a power user would want. Among its specialized features are (1) the ability to enter text without limit with full forward/backward word wrap; (2) capability to install up to 99 levels in an outline; (3) insert and remove fields of text across multiple fields; and (4) an on-line reference card and help file for every command and prompt. Best of all MaxThink costs only $89.00. This is less than half of ThinkTank's suggested retail price of $195.00.

A Word Processor for Specification Writing: Ever since Apple announced it would no longer bundle MaxWrite with the Macintosh, a whole slew of word processing programs have been announced for the Macintosh. The first of these new products to become available is MacSpec by LM Software. MacSpec is designed for writing specifications, documentation, and technical papers.

Unlike MacWrite and Microsoft Word, MacSpec processes sections. Section numbers and indentation are provided automatically. Among its specialized features are (1) automatic section renumbering and (2) automatic creation of a table of contents. MacSpec has a suggested retail price of $199.95 and a demonstration diskette is available for $15.

Two New Utility Programs: PBI Software recently released two new software packages; HFS Locator Plus and HD Backup. HFS Locator Plus is a desk accessory that can locate, delete, copy, and rename Hierarchial File System files without leaving an application. The files (and the folders they reside in) can be located by date, or by a partial/matching name. HFS Locator Plus has a suggested retail price of $24.95.

HD Backup is a generic backup utility that copies files from hard disks to floppy disks. It supports both the MFS and HFS systems. It can perform both global and incremental back-ups (i.e. back-ups only changed files from the last global back-up). All files are maintained as standard files and not encrypted. According to PBI, HD Back-up has been tested with all SCSI hard disk drives currently available for the Macintosh Plus, plus most of the serial hard disks (e.g. Corvus, Tecmar, Paradise) that work with the 128K and 512K Macintosh. HD Back-up has a suggested list price of $49.95.

Old Time Art: If you like Currier and Ives and other turn of the century lithographs take a look at the MacMemories series by Image Worlds. This is a set of thirteen diskettes each containing approximately 400K of high quality MacPaint documents. Each diskette is based around a common theme such as children, the animal kingdom, holidays, and the wild, wild west. Each diskette is $39.95 and an "Image Index" to the entire set is available for $5.00.

What The Heck Is It? Since I started writing this column a year and a half ago, I have seen all kinds of programs. But I have finally come across a program that my poor brain cannot comprehend. As far as I can tell, it has no purpose other than generating pretty screens. Called Pattern Breeder, it was developed by an Australian company. Simplistically the program "demonstrates a praticularly interesting subclass of currently fashionable super-class of mathematical processes known as finite state automata." (Honest to God, this is straight out of the manual.) As far as I can tell the program is a version of the classic game, Life. The only difference is that you can edit the seed that controls the output.

If, by this time, you are thoroughly confused, join the crowd. Notwithstanding the features and ultimate utility of the program, it was not that well written. The program is written in Microsoft BASIC Version 2.0 and comes with a runtime version of BASIC on the diskette. As a result the program is sometimes slow in responding to menu bar selections. The program would have been much better had it been in compiled BASIC or some other compiled language. Additionally the manual is not well written. Half of it deals with the history of finite state automata. Even after reading it a dozen times, I am not sure exactly what a finite state automata is supposed to be. The other half of the manual attempts to explain how to use the program. As such it does a semi-credible job of explaining what the various menus do.

Pattern Breeder has a suggested retail price of $39.95 and is only available from Mac America, the Australian developer's authorized American distributor.

Copy II Mac Update: The good folks at Central Point Software recently released version 5.2 of this venerable program. According to the dealer, who sold it to me, this version is HFS compatible. Well it is and is not. Copy II Mac consists of three programs; Copy II Hard Disk, Copy II Mac, and MacTools. Copy II Mac is totally HFS compatible. Copy II Hard Disk is semi HFS compatible. It cannot read from a HFS disk but it will copy onto a HFS disk. MacTools is totally non-HFS compatible.

Upcoming Mac Shows: If you are in a traveling mood, there are a number of dedicated Macintosh shows coming later this year. Currently scheduled are (1) the MACazine MacExpo, August 1-3, at the Anaheim Convention Center, Anaheim, CA (across the street from Disneyland); (2) the Macworld Expo, August 14-16, at the Bayside Exposition Center in Boston; (3) the Mac Show, October 16-18, at Madison Square Garden, New York City; (4) the Macworld Expo, October 9-11, at Market Hall in Dallas; and (5) still another Macworld Expo, January 15-17, 1987, to be held in Brooks Hall, San Francisco. With a little bit of luck I will be at the January Macworld Expo.

myDiskLabeler version 2: This program is an intelligent label printer that allows the user to design and print "professional looking" labels using a variety of fonts styles and sizes. Among its capabilities are (1) the ability to grab icons from application programs and edit them, (2) access MacPaint documents for drawings, (3) use a variety of fonts styles and sizes. Among its capabilites are (1) the ability to grab icons from application programs and edit them, (2) access MacPaint documents for drawings, (3) use a variety of font styles and sizes in preparing the label, and (4) sort directories. myDiskLabeler can print single or multiple labels using its "intelligent" label interface. The label(s) to be printed are first selected by viewing an image of the label sheet on the Macintosh screen and clicking the positions to be printed. The sheet is then aligned using its special label alignment form. myDiskLabeler costs $44.95 and comes with 54 label sheets.

As useful as this program is, I cannot recommend it. First and foremost the program is not well thought out. For example, it is only semi-hard disk compatible. The grab icon feature will grab an icon from a hard disk volume, yet the read folder/file capability only works with the floppy drives. Second the program is only semi-Macintosh compatible. The promotional literature claims it supports the Macintosh compatible. The promotional literature claims it supports the Macintosh 128, 512, XL, and Plus. However, it needs Finder 5.2 and System 3.1. According to my technical sources these should not be used on a 128K or 512K Macintosh. They were designed for the Macintosh Plus. Even if they do work, the system file 3.1 has already been superseded by 3.1.1. Every time, I used the program on my MacBottom with 3.1.1 it crashed. Finally I am not happy with the "Smart Labels" that came with the program. They are not sticky enough for me. Three out of five became loose within 24 hours after putting them on.

As a side note, the program may be copy protected. There were a number of comments on Compuserve talking about the copy protection used on this program. However, I was able to make a working floppy program by clicking and dragging the files.

Compuserve Material: Normally I try to mention only new material in this section. However, a program I mentioned two months ago has improved so much that it deserves another plug.

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ATARI

Applying The Atari

by Jeff Brenner

"Applying The Atari" is two years old this month! And we're going to celebrate with August's feature program: a practical computerized phone directory program.

Since the inception of "Applying The Atari," in August 1984, we have been steadily gaining new readers, in spite of Atari's incredible instability during that period of time. But the present outlook for Atari is healthier than it has been for years. The ST line has been a wonderful success, and Atari's 130XE is selling strong. And now Atari is arousing excitement in a completely different league with its anticipated CAD/CAM machines.

And what does the future hold for "Applying The Atari?" As I have said in the past, this column will remain devoted to the 8-bit line. Atari, too, has pledged to continue supporting the 8-bit line with software and hardware, such as an 80-column card due to be released this month and 3.5 inch disk drives. Many ST-owners have been asking for ST-compatible "Applying The Atari" diskettes, and if the interest is strong enough, I will create two versions, 8-bit and 16-bit, of future "Applying the Atari" programs. Any such ST listings would be printed in a separate article or section, though, and would not take away from 8-bit Atari space. Let me know if you're interested.

Reader Mail

Dear Jeff:

While reading the "Atari Help" column in the April 1986 issue of *Computer Shopper*, I became very interested in the name "Omniview," which was mentioned by Mr. Alan McPherron. In the article, Mr. McPherron was complaining of the poor performance of his monitor. The paragraph was entitled XL "Video Smears," and concerned characters which were not clear. He concluded the article by relating that he was considering the Omniview for his XL, but elected not to because his video probelms were bad enough with 40 columns. To put it in a nutshell, what is Omniview? In closing, regarding Mr. McPherron's problem, I am using a Zenith monitor, Model ZVM-1220-A, and my characters are superbly sharp. The price was only $99.00 and I am perfectly satisfied.

Thomas H. Connors
SSG, US Army Europe

A. Omniview is an 80-column adapter which allows the Atari to display 80 characters per line when used with software designed for it. Mr. McPherron was concerned that since he could not get a sharp display with Atari's normal 40-column screen, an 80-column screen would make matters worse. Many 800XL owners have written to me about the blurred-character problem, which is apparently caused by the 800XL's lack of chroma pin output (used with a monitor). Still others have said they have not had any problem at all.

For those suffering with XL "video smears," a simple hardware remedy, submitted by Ricky J. Burgett, was published in the June 1986 column.

And while on the subject of video displays:

Dear Jeff:

I use a Sharp 7 system color TV for a monitor. I think my RF modulator is FUBAR because since I have had the XL I would get red and green vertical bars on the screen after about an hour of use. Also, turning on my printer made my display unreadable. A friend pointed out that his TV was supposed to be a "monitor/TV" and tried using a five pin din to RCA stereo cable to connect the video output to the VCR input on his monitor/TV. It works very nicely. We have a super sharp picture with absolutely no interference.

Mike Blevins
APO, New York

A. I've printed your diagram under Figure 1. Thanks for sharing it.

Dear Jeff:

Now that I have a XM301 modem and two of the fastest "disk drives" around (RAMDISKS) and a 1050 drive, I have thought about putting up my own BBS. I would like to be able to put a large message and upload/download base for public domain software, but the hardware to interface Atari hard drives and 8 inch floppies cost mega bucks! I was looking through the *Computer Shopper* and had a thought. What if an interface could be built and programmed (with an EPROM burner) to interface the lesser expensive 10MB driver and IBM drives. I have seen used and untested drives around $50-$160!!! The ATR8000 would (I hear) interface these drives, but the cost is way out of my range.

Patrick Presley
Tumberton, Texas

A. While I'm sure it would be possible to build the type of interface you write of, it would be an enormous task, and I, for one, certainly would not want to undertake it. Designing the hardware is difficult and time consuming as it is. Designing software from scratch for your new interface is then an additional burden. People who undertake such projects are usually those who ultimately intend to market a finished product, such as the ATR8000. Otherwise you may feel the effort is just not worth it.

Since you already have RAMdisks, you can build yourself quite a powerful bulletin board by adding a hard disk drive specifically designed for your Atari. Supra Corporation (1133 Commercial Way, Albany, OR 97321) sells a 10MB hard disk, which includes a hard disk DOS, for $799. True, this too may be out of your price range, but if you are very serious about running a bulletin board, you should consider it. The drive could, of course, be used for other applications when your bulletin board is not on-line. Supra also sells it's hard disk interface separately for $250.

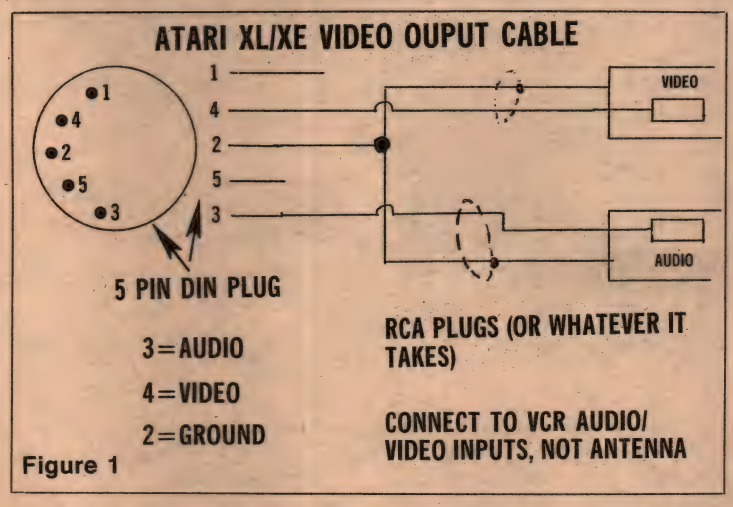


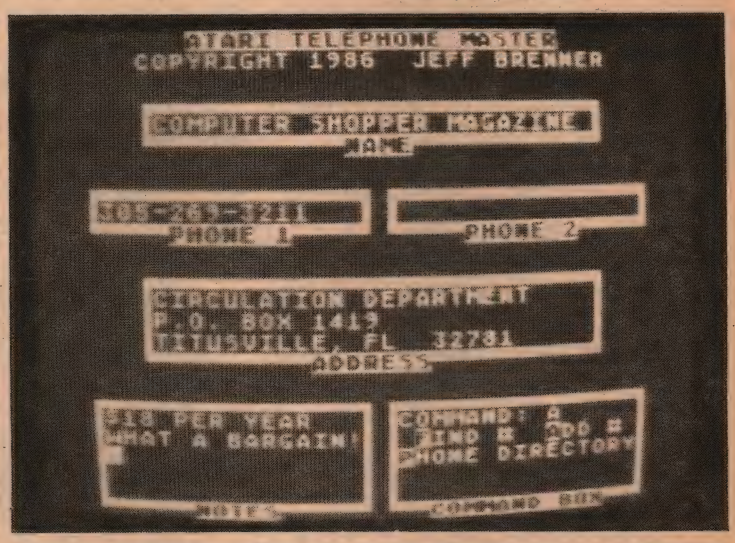
Figure 1

Book Winner

Congratulations to Gene Gnandt of Houston, Texas. Gene won WSI's *Atari XL User's Handbook* ($15.95, Weber Systems Inc., 8437 Mayfield Road, Cleveland, OH 44026) in April's random drawing.

Newsletters

This month's mail brings the newsletter of the High Sierra Atari Users Group (P.O. Box 2152, Sparks, NV 89432), the thick JACG Newsletter from the Jersey Atari Computer Group (14 Whitman Drive, Denville, NJ 07834), and the N.O.A.U.G. newsletter of the New Orleans Atari Users Group (5630 Jefferson Hwy., Harahan, LA 70123).



Atari Telephone Master

Atari Telephone Master lets you record and recall all of your telephone numbers. One or two numbers can be stored for each person. In addition, Atari Telephone Master allows you to record the address and a note for each person on file. A directory command gives you a complete, alphabetized directory of all numbers.

The program is listed under the "Atari Telephone Master" heading. It's a long program, so I urge you to use Program Perfect if you're typing in the program. A minimum of 32K RAM and a disk drive are required to use Atari Telephone Master.

Running The Program

Once the program has been entered, save it to diskette. Now RUN the program. You'll be asked to "Insert Data Disk And Press Return." You can use the same diskette that the program was saved on, or you can use a blank, formatted diskette if you want to store as many names as possible on a single diskette. Depending on the disk drive density being used and the amount of memory in your computer, you can store hundreds of names on a single diskette.

When your data diskette is in place, press Return and you'll be told, "No Phone File On This Diskette," and then asked, "Create a File On This Disk?" Since this is the first time you are using the program, you must create a file, so press Y. To store as many names as possible to a single diskette, you may choose to insert a blank, formatted diskette before you press y.

The next screen is the main display. Photo 1 shows this screen on a preliminary version of the program. The current version displays in the upper-left corner of the screen the number of names in memory at any time, and the maximum number of names allowed by

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Parrot Sound Digitizer

by Jeff Brenner

All across America Atari owners are digitizing themselves, their families, neighbors, cars, disk drives, shoes and anything else that can stand still for nine seconds, thanks to Digitial Vision's ComputerEyes. In another dimension of excitement, Atari owners are digitizing their voices, musical instruments, breaking glass, and barking dogs, among other sounds, with Covox's Voice Master. And now Alpha Systems will certainly put many more sound digitizers into Atari owners' hands with its Parrot sound digitizer. At $39.95, hardware and software included, Parrot costs less than half the price of Covox's $89.95 Voice Master and offers comparable sound digitizing performance.

You Get What You Pay For?

The secret to Alpha System's low price is apparent immediately upon opening the package. I was not sure if some fellow Atarian had invaded my mailbox or if I was the victim of some awful mail order fraud. Inside was a paddle game controller with a microphone jack in it (actually half of a two-paddle controller; the other paddle had been cut off), a jumper wire, an instruction manual and a diskette. My suspicions were alleviated slightly when I began reading the instruction manual. Sure enough, right there on page eight was a drawing of the half-of-a-paddle-controller sound digitizer. Still, I was disappointed. I wouldn't even leave my own hardware projects in such a raw state. Alpha Systems could make their customers a lot more satisfied by charging five or ten dollars more and sticking the device in a cheap project box.

But It Works!

Unlike Voice Master, Parrot does not include its own microphone. You can either plug your own microphone into the input jack, or use the jumper wire to connect the Parrot directly to a sound source, such as the output jack of a cassette player or radio.

The sound digitizing, or sampling, is performed through the Parrot Sampler Program included on the diskette. The paddle dial is used to "fine-tune" the digitizer as you whistle into the microphone (or play a tape) until an acceptable quality of sound is heard through the television speaker. The sound quality that you achieve through the fine-tuning procedure will be the same that you get when you begin the actual sound sampling.

Digitizing with a microphone was easy enough. After fine-tuning, I selected the Record option, spoke a few words, and then used the Playback option to hear my Atari speak by words. The Parrot's sound quality was comparable to Voice Master's, although this will vary from user to user depending upon the quality of the microphone and the nature of the sound source used.

Sampling from a cassette player proved to be much more difficult than with a microphone. In addition to the paddle dial, it was necessary to adjust the volume, treble and bass controls to get an acceptable sound sample, but I could not achieve the same level of quality I had with the microphone. The solution, I found, was to tape the microphone to one of the ear-pieces of headphones that were plugged into the tape player. That seemingly nonproductive maneuver increased the sound quality from the tape recorder dramatically. Also, you'll want to use a battery operated tape player or radio when sampling from these sources; anything plugged into the house current tends to produce excessive interference in the resultant sound sample.

In addition to the fine-tuning, record, and playback options, the Parrot Sampler Program also allows you to save samples to disk for later retrieval.

The Emulator

Included on the Parrot diskette is the Emulator Program, an excellent sound editing program that easily compensates for the cheap digitizer hardware. Modeled after an expensive music synthesizer of the same name, the Emulator Program lets you use your Atari keyboard to play you sampled sounds. You can edit and combine sound files, plot the sound waves on a graph, and even change the actual sound.

The Emulator offers nine tracks in which sound data can be stored; thus as many as nine different sounds can reside in memory at once. Sampled

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Applying The Atari
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your system. Additionally, the current version displays the following commands in the Command box: Find, Add, Print, Edit, Quit and # Dir.

The first thing you'll want to do is add names. Press A for this command. The cursor will appear in the Name box. Type the first name followed by the last name (with middle names or initials between them, of course) and press Return. The cursor will appear in the Phone 1 box. If you need to move back to the Name box, use the control-cursor keys or the Delete key to bring the cursor to the left-most side of the box and press Delete.

In the Phone 1 box, type the phone number. If an individual has two telephone numbers, type the second number in the Phone 2 box, otherwise press Return and the cursor will move into the Address box. The Select key can also be used to move to the next box.

Up to three lines can be typed in the Address box. If you only need two lines, simply press Return on the third line, or press the Select key. Finally, the Notes box is for any information about the individual you want to jot down. Since this information is printed along with each name when a phone directory is listed, you might want to describe the individual's relation to you (i.e. doctor, attorney, etc.), or you can store temporary information that can be deleted later (i.e. "This guy owes me eleven bucks"). Up to five lines can be typed in the Notes box. When you're done, type Return on a blank line or press Select. The information you have entered will be saved to disk and the cursor will reappear in the Name box so you can type the next name.

When you have finished entering names and numbers for a session, press the ESC key. The names will then be alphabetized, additional data will be saved to the diskette, and you will be returned to the Command prompt.

One note about the command box before we learn about the other commands: All instructions and error messages are displayed on the last line of the Command box, so it's a good idea to keep an eye on that part of the screen.

The Find command allows you to look up a particular individual's number, address, and notes. Press F and then type the name of the individual. It is not necessary to type the full name of the person; only the last name, or even an initial and a last name (i.e. type Smith or T. Smith to find Theodore Smith). Of course, if your data file contained a Theodore Smith and a Tom Smith, you would have to type the full name to get the person you want. If the name is not found, you'll get a "Not Found" message in the Command box.

Once you have found a name, or whenever a name/number is displayed on the screen, you can press E at the "COMMAND:" prompt to add, change or delete any of the information on the screen. Use the control-cursor keys to move within a box, and the Select key to move to the next box. Pressing Delete when the cursor is in the upper, left hand corner of a box will bring the cursor to the previous box. When you have finished editing, press the ESC key and the changes will be saved.

Press P to printout the information currently displayed on the screen (if you have a printer). If you just wanted to look up someone's number, you could use the Find command to look up the number, print it on the printer and drag the sheet to the telephone.

The # DIR command (press D) gives you a printout of all the names and addresses, phone numbers and notes on your diskette. The names are alphabetized and printed last name first, so the pages of this printout can be stapled together and used as a personal phone directory. If you want to interrupt the printing of the directory, press ESC.

The Quit command ends the program and brings you to the BASIC "Ready" prompt. Unlike the June 1986 Budget-Mate, it is not a necessity that you end with the Quit command; you won't lose any data if you just shut off the computer (provided you are at the "Command:" prompt and not in the middle of some operation). However, it is a good practice to end with a Quit command, so make it a habit.

I hope you enjoy the Atari Telephone Master. Some of your BASIC programmers may want to add additional commands to make this program even more powerful. One that immediately comes to mind is an autodialer, for those of you with autodial modems. The string variables PHONE1$ and PHONE2$ contain the phone numbers that appear on the screen at any time, and you could easily add a "CALL" command which would automatically dial up the person on the screen.

Next Month

We'll learn how Atari Telephone Master works, and we'll have more reader mail, new products, and a surprise program to start off the third year of "Applying The Atari."

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

A diskette of this month's program is available from the author for $7.00, postpaid. Please make checks payable to "Jeff Brenner" and specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers may send $5.00 for a diskette or a SASE for a listing of this program.

Address all correspondence to: Jeff Brenner, "Applying The Atari 8/86", c/o *Computer Shopper*, P.O. Box F, Titusville, FL 32781. ●

Programs for Applying The Atari shown on pgs. 204, 206.

ATARI ST

Hacking The ST

by Wynn Rostek

Mutual ST Help

I had mentioned in a previous column that everyone was looking for a source for the video connectors used on the ST. Search no longer, we have found a source. Mark Spires from "At Your Service" has the connectors. It took Mike 3 weeks worth of phone calls to locate a source for the connectors. The connectors are $15 each, and he has 5 foot cables with composite video and audio for $20.

I suggest you contact Mike before ordering, he can not take VISA or MASTERCARD. The address is: At Your Service, 2856 Leechburg Rd., Lower Burrell, PA 15068, ATTEN: Mike Spires.

You can also order the connectors and cables by leaving a message or Email on the Atari Elite BBS. The Atari Elite BBS is an ST FOREM board and runs 300, 1200, and 2400 baud. It is up 24 hours a day. The BBS number is (412) 384-5609. If you want to talk to Mike, call him at (412) 335-4477.

ATTENTION! Mike Spires also passes along a tip, the STs with a built-in RF modulator have composite video on pin 2 of the video connector. This is not mentioned in any of the Atari documentation, the service information.

Fred Hawkins suggested that we investigate the fflush function for clearing buffers. The fflush function is used to force a disk write. The ST buffers disk data in memory. Each open disk file has its own buffer. When you write to disk, you are really writing to memory where the disk data is buffered. To ensure that any change you have made to the file is actually on the disk, you can use the fflush function to force a disk write. The fflush function works only if you use the C file functions.

When you close a file, or exit a C program, it will call fflush to ensure the disk is updated correctly.

Since we used the Bconin functions, we have bypassed the C file functions, and the fflush wouldn't work anyway. In most systems, fflush does not work with physical devices, only disk files. (In spite of the attempt to erase all differences between devices and disk files, some still exist.) Fred also has good words for *Common C Functions* by Kim Jon Brand. I have not seen this book, but I have several other books on C from Que, and all of them are excellent.

F. H. Marz is trying to use the graphics capabilities of the ST, but is looking for a language other than C to do it with. He is looking for a good book on Logo. The book Atari supplied, *A Sourcebook for Atari Logo* is too brief for beginners. I have not used Logo, but there is a book *Atari ST Logo* by Martin Sims from Hayden Book Company that covers programming in Logo on the ST. *The Atari ST User's Guide* by John Heilborn from Osborne McGraw-Hill also has a couple of chapters on Logo programming. I have not read either of these books, but I have noticed them on the shelves of our local bookstore. (I can only afford to buy so many books a week, and Logo is one language I have not really played around with.)

Logo is not really the language to use for graphics programming on the ST, many of the special features of GEM (most of them in fact) are not available in Logo. If you find C too hard (it is not a beginner friendly language) but still want to try to use the special features of GEM (like drop-down menus, windows and alerts) you may seriously consider Personal Pascal from OSS.

ST BASIC also has interfaces to many of the GEM routines, look in your copy of *ST BASIC Sourcebook* under GEMSYS. You will need additional information on the AES interface in order to use this function. The only good sources I know of now are the ST developers kit and *Atari ST GEM Programmer's Reference* from Abacus.

I will be briefly reviewing *Atari ST GEM Programmer's Reference* here to give you some idea as to whether you want to buy it or not.

Chapter 1 is a brief introduction to GEM. Since Chapter 1 is only 9 pages long, the introduction is very brief indeed. Chapter 2 is a very short introduction to C and 68000 assembly language programming. I think this section could have been easily left out, it is too brief to serve as a guide for anyone using C or 68000 assembly language for the first time. There are many good books available on C programming and 68000 assembly language.

Chapter 3 covers the VDI portion of GEM. Pages 61 through 229 contain definitions of the VDI functions and tells you the input and output parameters used. This is a good explanation of what functions are available, but it is not a tutorial on the use of the VDI. They have presented 6 C programs and 2 assembly programs at the end of Chapter 3 to illustrate the use of some of the VDI calls. This should be enough to get you started, and experimenting with the VDI calls can be an awful lot of fun.

The VDI is the low level graphics interface of GEM. (The line-a interface is the lowest level graphics interface, and I'll cover a few of the line-a routines later in this column.) The VDI allows you to prepare the ST for graphics operations, load and unload different fonts (text styles) and draw lines, polygons, bars, arcs, circles, ellipses and select fill patterns. It also provides an interface to the mouse and keyboard.

Chapter 4 covers the AES. The AES is the workhorse of the Desktop. The AES allows you to use menu bars, dialog boxes, icons, and windows. The first part of Chapter 4 is an introduction to the way the AES handles the major functions. This section gives you some insight into how to use the AES calls to create a graphics program.

The AES information is presented in a more tutorial format with a lot of explanation in the first part of the chapter. The middle portion of Chapter 4 is a list of the AES functions and the parameters used by them. The end of Chapter 4 contains a C program and 3 assembly language programs showing the AES in action.

I was not overly impressed with Chapters 1 and 2, and I wonder why they even bothered to include them. Chapter 3 is a good run-down on what VDI functions are available but could have used a little more explanation of some of the functions. The coverage of the AES functions in Chapter 4 is very good. The explanations given go a long way towards making the AES easier to use. We have the AES documentation from the developers tool kit and from a GEM seminar given by DRI, and they are not as useful to the average programmer as Chapter 4 of *Atari ST GEM Programmer's Reference.*

If you happen to have some graphics background, GEM is based on the GSX package developed by DRI, which was based on the GKS standard. If you know GKS, you should be able to pick up GEM in a day or two.

Atari has just notified us that a new version of the Alcyon C compiler is available. There is a $20 upgrade fee for the new version. The new version has cleaned up some minor bugs and added double precision floating point numbers. They have also provided a working version of the archive utility AR68, a tool I am looking forward to having.

Line-a Interface

I have mentioned the line-a interface several times. This month I'll give you a few quick routines to show some of the line-a routines in action. One thing you will notice from the VDI and AES documentation is that the screen positions on the ST have the origin in the upper left corner. 0,0 is the top left-most point on the screen. This means that the Y axis is upside down from what you would expect.

One of the nice things we can do here is flip the Y axis back around the way you would expect it to be.

Unlike most columns, this column will have some assembly language routines. If you are serious about hacking the ST, you will need to learn assembly language sooner or later. The routines presented here are set up so they can be called from the Alcyon C compiler.

When you call a function from C, the assembly language generated does something funny with the names of the function. The Alcyon compiler adds an underscore as the first character of a name. If you have the following code;

```
result = conver (x);
```

The assembly language generated by the compiler would look something like:

```
move.w    12(sp),-(sp)
jsr       _convert
move.w    d0,14(sp)
```

The important thing to keep in mind when writing assembly language routines that you may want to call from C is to always use an underscore character as the first character of the name.

Before I get into the program proper, I'd like to give you a little background information on graphics so you can follow the code a little better. Suppose someone asks you to draw a diagonal line across a sheet of paper. With a straight edge and a pencil, the task is pretty easy. This is because you are dealing with a continuous process. On the screen of your ST, it is a little trickier to draw a line because the display is discrete.

There are 640 dots horizontally and 200 dots vertically on the ST in medium resolution. If you want to draw a line from the point 0,0 to the point 4,3, you would have to decide which pixels to turn on. Just connecting the points with a straight line is an easy solution, but the ST has only a limited number of pixels to work with, so it has to decide somehow which pixels should be on.

Converting a continous line to a series of pixels is called rasterization, and there are several ways to do it. One of the simplest ways to go about deciding which pixels to turn on is to use the Basic Incremental algorithm. Conceptually, this approach is very simple. If you know the two end points x1,y1 and x2,y2, you can find the slope of the line connecting the two points. The slope is delta y / delta x or (y2 - y1) / (x2 - x1). If you compute the slope M, then you can find out which pixel to turn on by turning on the first pixel, then incrementing x and adding M to the y value. If you round y off, you have the next pixel to turn on.

The reason this works is because the slope is really how much y changes for each unit change in x. If the points were 0,0 and 4,3, then the slope would be (3 - 0) / (4 - 0) or 3/4. This means that everytime you add 1 to x, you should add .75

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LISP On The ST

by H. Clark Robbins

You started with BASIC, Pascal, and Fortran so you need a change. C is a challenge, but you need something really new in your life. Different. Exciting. Challenging. Cheap. I know just what you need.

It is solid, standard, available for your machine, and it is free. It's XLISP.

XLISP has been available in the public domain for a long time. There are versions for CP/M, PC, Mac, Atari ST and Amiga. XLISP, as you may have guessed, is a version of LISP, the LISt Processing language. LISP is generally recognized as the Artificial Intelligence language.

It is easier to tell you what LISP is than to tell you what Artificial Intelligence is. Nearly all the AI programs are written in LISP. Expert problem solvers can diagnose internal combustion engine problems or blood diseases. LISP programs can simulate human reasoning, condensing huge volumes of information to make decisions or ascertain trends. The most interesting AI area is that of learning, in which computers use "past experience" to deduce facts. However, it is easy to start fooling around with LISP without having any background in AI. After you see what LISP can do you will get a handle on the concept of Artificial Intelligence.

Until recently there was no standard for LISP, which allowed it to grow and change. Now many LISP programmers are choosing to use a Common LISP, which makes their code more transportable. It is interesting to note that LISP procedures and LISP data use the same format. Therefore, it follows that a LISP procedure can write a LISP procedure and then execute it.

What LISP does better than anything is list manipulation, of course. You can cut lists up, put them back together, move elements from one list to another, treat lists as data or use them to manipulate other lists. You can search them, sort them, and call them recursively.

Recursion is widely used in LISP. This sample shows a simple case of recursion: the factorial of a number.

```
user:       (defun factorial (n)
                  (cond ((= n 1) 1)                    ; define the function
                  (t (* n (factorial (- n 1))))))      ; test for done
XLISP:      FACTORIAL                                  ; multiply recursively
user:       (factorial 4)
XLISP:      24
```

In XLISP symbol names can be made up with any sequence of printable characters, excluding ( ) / ' " , ; and blanks. All lower-case alpha-characters are interpreted as upper-case. This allows you to create some very meaningful symbol names. Note that this also allows you to "rename" some of the existing primitives from XLISP. For example a programmer could customize his procedure for multiplying numbers.

First I must warn you that this is going to look a little different from what you are probably accustomed to. The word "bizarre" may immediately come to mind. However, there is some method to LISP's madness: the first element of a list is the procedure, followed by some number of arguments. A programmer could enter:

```
user:       ( * 3 5 2 )
XLISP:      30
```

to perform the multiplication 3 x 5 x 2. If he wanted to wreak a little havoc, he might modify his code to say.

```
user:       ( setq my-multiply *)
user:       ( my-multiply 3 5 2 )
XLISP:      30
```

On the other hand, it may be advantageous to use one of the symbols that are popularly "reserved keywords" for some other purpose. If this programmer knew he would not need a division function for his program but needed a symbol to save the ASCII representation of the slash character, he may choose to save it as that symbol.

```
user:       ( setq / 47 )
user:       ( eval / )
XLISP:      47

      So if there is a need to accommodate a mathematician that
doesn't like to type much, we can create FACTORIAL  as simply the
symbol " ! ".

user:       (defun ! (n)                               ; define the function
                  (cond ((= n 1) 1)                    ; test for done
                  (t (* n ( ! (- n 1))))))             ; multiply recursively
XLISP:      !
user:       (! 4)
XLISP:      24
```

XLISP was written by David Betz in C. XLISP 1.1 appeared in the public domain for CP/M 80 a few years ago, but lacked a lot of the "standard" features. That was because the compiled code filled a good portion of memory, leaving little room for XLISP applications. Even today XLISP 1.1 is the highest rev available for CP/M 80. XLISP 1.5 is available for the PC, Amiga, and Atari ST. This version is standard, capable, and easy to use.

Each version of XLISP includes a document that is unusually comprehensive, considering the usual public domain documentation standards. In his document, Betz covers the features he incorporated into XLISP, and a discussion of the data types, symbols, and functions of XLISP. Of course, like all language software documents, it is not intended to teach you LISP, but rather to instruct you in the use of XLISP. Betz recommends the text LISP, 2nd Edition, by Winston and Horn. You might want to look it over before you start LISPing.

XLISP is an interpreted language, which makes it a fine learning tool. As each line of code is entered, terminated by a carriage return, the XLISP prompt tells you the level of nesting still unfulfilled, i.e. the number of unclosed parentheses. In complex procedures that is usually an indication the user has forgotten one of the many parentheses terminating a procedure: an error akin to forgetting a semicolon in Pascal.

XLISP supports many esoteric list manipulation symbols not supported by other LISPs, e.g. "nthcdr" is the nth element of a list. You can easily create many more of these symbols as needed. XLISP also supports the outdated PROG feature, which may be helpful if you are trying to resurrect a program ported from another machine. XLISP's *BREAK-ENABLE* feature provides an "error-level" display with every prompt to the user. Incrementing with every fauXLISP pas, it is an everpresent reminder of your fallibility. This feature may be useful to XLISP experts, but it can be confusing to the neophyte. This is a default and can be changed, but it is easiest to just try to ignore it. It will keep you humble.

XLISP is not without its flaws. You can save and load functions you define, but there is no way to save the entire working set. This is a major drawback if you are just fooling around and you create a work of genius: you have no way of recreating the sequence of steps you took to get there. Of course, this will never happen to any of us because we all design before we code, don't we?

Have fun with XLISP. If you would like to use it commercially, you will first need to talk over the commercial implications with David Betz. He will even provide technical assistance to users in trouble. How many contributors to the public domain can say that? Even though this was not distributed as shareware, I'm sure he wouldn't mind being thanked in a concrete way for his help. Betz is currently working on XLISP 1.7 for the PC, Amiga, Mac, and ST. That should be out in a few months with some new features and new documentation. XLISP users are looking forward to that.

XLISP is not all things to all people. After having played with XLISP for a while, if you are really hooked and want to spend a lot of time with a LISP, you should check out Golden Common Lisp for the PC, a Common LISP developed by Gold Hill Computers (163 Harvard St, Cambridge, Massachusetts 02139 (617) 492-2071). It is a complete LISP developing environment. It has an GMACS editor, a GC LISP interpreter, on-line help, examples, and the San Marco Lisp Explorer, a full blown on-line tutorial. The user interface is very comfortable with all the bells and whistles you can imagine: in the interpreter, the level of nesting is annotated by the blinking parenthesis that opens the current level of nesting—what a handy feature! The package includes comprehensive documentation and two texts, one of which is the ubiquitous LISP, by Winston and Horn. The price is around $500 so I obviously can't recommend a hobbyist run right out and buy it if he has never used LISP before and doesn't know if he will like it. (Universities can get six or more copies at $100 each.) I was surprised to learn the package is copy protected because I don't know anyone who could recommend you buy development tools that are copy protected. But if you're a serious LISP lover, there is no better environment for development.

Of course, if you would like a look at an Artificial Intelligence example from a creative standpoint, there's HippoBackgammon. And you don't have to learn a new language.

Hippo Soft now has a backgammon game available for the Atari ST. Computer adaptations of parlor games have been around since the early days of computers and really haven't changed very much. Each game developer tries a twist to keep his game from looking pretty much like one that ran on a TRS 80 ten years ago. The twist in HippoBackgammon is Artificial Intelligence. Hippo Soft wants to teach the user the meaning of AI by allowing him to modify the thinking of his computer-opponent, called a Robot.

Backgammon is a simple game: the rules can be learned in an hour and the techniques can be learned in just a few sessions. The ability to alter the characteristics of your opponents is a great tool in learning Backgammon style. You can change the significance to each of your Robot's moves to make it play a different strategy. Their preprogrammed "expert" Robot is pretty darn good. The Expert Robot plays a very conservative game. It doesn't like a bloodbath. I do. It usually wins.

A few general comments on the program: HippoBackgammon has a very nice display in low res. The colors selected are pleasing to the eye, and provide a professional look. After your eyes get a little tired the red begins to look too much like the black. The other color selection, blues, lavenders, and purples is much easier to see but is aesthetically unpleasing.

The Backgammon setup seems awfully slow, but is only 15 seconds. The game defaults to a human vs expert robot game, with human getting first roll of the dice. This can be changed from within a pull-down menu, allowing the user to elect to challenge one of his customized robots or one of three preprogrammed robots: Expert, Medium, or Novice. If he so chooses, he can have two robots play each other and just sit back to watch the fun.

In the human vs Robot game the human makes his move then passes the dice to his opponent by clicking once on the dice. Until you pass the dice, you can use UNDO to change your move. The program will make sure that any move you make is legal; otherwise it will return the piece to its origin and allow you to try it again. There is never an indication that all your legal moves have been made. In fact, the software does not force you to take

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TEXAS INSTRUMENTS

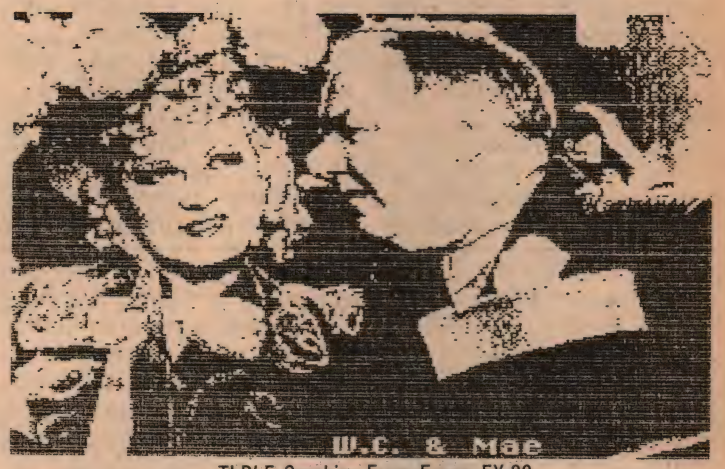
TI Forum

by Ron Albright & Jonathan Zittrain

In the July column we asked for letters from those interested in hearing more about C99 and since we did, we'll cover more in this column. We will go into C99 programming in more depth and will compose a short program which will demonstrate console input and output. The program, again, will not "do" anything, but it will demonstrate how to display information on the screen and accept user input from the keyboard. It will also demonstrate one of the most powerful features of C99, that is, a direct assembly language interface which will allow the inclusion of assembly language code into the C99 source code for direct assembly by the Editor/Assembler package. We will take a source code listing and examine it line-by-line, explaining each function as we go along.

If you will, take a look at Listing 1 for an example of a C99 program. Let's make a couple of observations. First, you will notice that the C99 program is typed in using lower case. It is standard C (and C99) syntax to type everything in a C program in lower case, except for constants in #define statements (which we do not use in this example. The one instance where we use upper-case, is in the direct assembly language interface statement "REF PRINTF". This is because everything between "#asm" and "#endasm" is in assembler syntax and not C99 syntax. It is ignored by the compiler and acted upon only by the assembler. The printf function (a powerful C routine) is in an external file on your system disk (it is a D/FBO already-assembled file) and is not acted upon by the compiler but must be loaded (like CSUP) before running this program. There are two ways to write libraries in C99. The first being to write it as source code in C syntax, which would be used in your program as an "#include DSKx.filename" statement. This type of library function has to be compiled and assembled fresh each time. These files are in D/V80 format and an example would be the "grflrf" library which holds the graphics commands in C99. We will use this type in a future program. The second way is to write it in C99, compile it, and assemble it to D/F80. This type of file, exemplified by the "printf" library function, is utilized with a"#asm",REF DSKx.file name, and "#endasm" sequence, as in our program. This second type of library is "ready-to-use" by the program and requires very little space in your compiled code. It is ignored by the compiler and, for the most part, by the assembler and will speed the process for program generation. But remember, when you use this external library, it MUST be loaded in after CSUP and from the option 3 E/A prompt, before running your program.

Now, let's look at the program. Lines 1 through 3 are our syntax to tell the compiler to ignore the lines between "#asm" and "#endasm", and the signal to the assembler that we will be using an external file "PRINTF" for our program. The next line is the required "main()"; function. As we noted in July, a "main()" function is required in every C program and is, traditionally, the first function call. The next line is the open brace "{" which marks the beginning of the function main. The next line is "putchar(12)". The putchar() function is an example of a function resident to C that is predefined in the compiler. It is no different from a user-defined function (like "main()") except that it is already known to the compiler. It is also an example of a function that needs to have a variable in its parenthesis, in our case, "12". What does this mean? Putchar() simply means to "put a character to the screen" (our "input/output" device, or "I/O"). We are printing ASC 12 (CTRL L) to the screen. What does it do? It simply clears the screen. It would be akin to "a CALL CLEAR" in Basic syntax. We could have printed any character to the screen with this function, by passing the desired ASCII number to putchar. If we had wanted to print an asterisk on the screen,



TI-RLE Graphics From Epson FX-80

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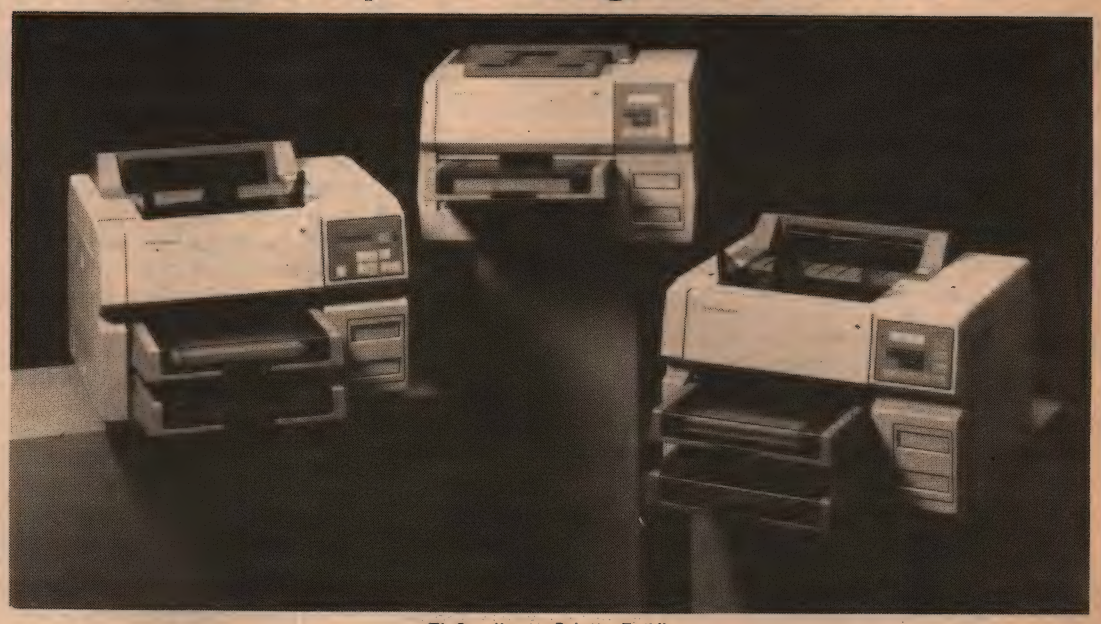
Texas Instruments Introduces New OmniLaser Family of Page Printers

Texas Instruments Incorporated recently announced the OmniLaser series 2000 family of page printers, setting a new measure for performance and reliability in laser printers. With faster printing speed, a much higher duty cycle and a machine life that is up to 15 times greater than first generation laser printers, TI's OminLaser printers represent a second generation of page printers designed for shared resource environments.

"By addressing the needs of the systems market, the OmniLaser printers can reduce the cost of ownership of page printers, since a printer can be shared by many users," said Tom Stringfellow, vice president and manager of the Peripheral Products Division in TI's Data Systems Group. "Because of significant advances in printing speed, durability and machine life, the OmniLaser printers are truly practical in the systems environment."

The OmniLaser Series 2000 family consists of three printers: the OmniLaser 2015, OmniLaser 2108, and OmniLaser 2115. The OmniLaser 2015 is intended for high-quality, high-volume word processing with limited graphics, while the OmniLaser 2108 and 2115 support the Adobe Systems Incorporated PostScript page description language, an emerging standard that allows users to print pages that integrate text, graphics and scanned images. All combine second-generation print engines with proprietary TI controllers to create high-performance page printers.


TI OmniLaser Printer Family

"TI's semiconductor technology capability will make possible significant price/performance advances in the OmniLaser Series 2000 family," Stringfellow said. "As TI perfects new technologies, we plan to incorporate them into the OmniLaser family to continue to bring the greatest possible value to users."

The OmniLaser 2015

With a print speed of 15 pages per minute (ppm), the OmniLaser 2015's print engine is nearly twice as fast as most first-generation laser printers, which typically prints eight ppm. The 2015 has a maximum duty cycle of 25,000 pages per month, compared to an average of 3,000 for first-generation printers; the 2015's durability ideally suits it for rigorous use with even a large system. And with a machine life of 1.5 million prints—up to 15 times greater than that of most current laser printers and the cost per page, much lower than its first generation counterparts.

The 2015 has the capacity to handle 500 sheets of paper through two 250-sheet input bins, allowing users the convenience of loading letter and legal size papers without fre-

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Texas Instruments Adopts PostScript For Laser Printer Family

In support of its introduction recently of the OmniLaser family of printers, Texas Instruments also announced an agreement with Adobe Systems Incorporated to adopt is PostScript page description language. PostScript will reside in two of TI's new OmniLaser Printers, the models 2108 and 2115.

PostScript allows the flexibility to fully integrate text and graphics, thereby allowing complete control over how the printed page will look. It enables the printing of rotated type, textures, patterns, halftones, images and incorporates a variety of graphic arts-quality typefaces that can be printed in any size and anywhere on the page.

"PostScript is a dynamic tool that will enable TI's OmniLaser printers to meet the needs of our target applications, including desk-top publishing, computer-aided engineering, forms generation and elaborate business presentations. These jobs require the full integration of text, graphics and scanned images," said Tom Stringfellow, vice president and manager of Peripheral Products Division in TI's Data Systems Group.

PostScript's state of the art capabilities have been adopted by many major manufacturers, including Digital Equipment Corporation, Apple Computer and Wang Laboratories Incorporated. PostScript is widely recognized in the industry as a leading page description language for printers.

The OmniLaser family of page printers includes the models 2015, 2108 and 2115. The OmniLaser 2015 can print 15 pages-per-minute with a basic controller for limited text and graphics. The models 2108 and 2115 use the PostScript controller. The model 2108 can print eight pages-per-minute, and has a duty cycle of 10,000 prints-per-month. Its life expectancy is approximately 600,000 prints. The model 2115 can print 15 pages-per-minute for an approximate 25,000 prints-per-month. Life expectancy for the models 2015 and 2115 is about 1.5 million prints, which is up to 15 times the expected output of first-generation printer engines.

For additional information contact Texas Instruments, P.O. Box 809063, H-861, Dallas, TX 75380-9063; (800) 527-3500. ●

TI Forum continued from page 81

we could have used "putchar(42)" (ASC 12 is CTRL L—a clear screen code). You will notice also that the putchar function is ended with a semicolon. Every function call in C is ended with a semicolon. Remember that and check your program lines for a semicolon after each line as it is, in my experience, the biggest single source of compiling errors when you are starting out.

The next line is a function call, I think, unique to C99. It is the "locate()" function. All this does is place the cursor on the screen at the row and column locations you pass to the variable, locate(). Think of it like the "DISPLAY AT (row, column)" statement in XB. Unlike the DISPLAY AT statement were you designate in one statement the row/column location AND the string, in the case of locate() you only designate the row/column. The next statement will designate what you want to print. So we pass row 9, column 10 to the locate() function and end it with a semicolon. Next, we designate what we want "displayed" in our two-part "DISPLAY AT" statement, using another function, "puts()." Puts simple means "put string." Just like putchar meant "print this char", puts simply means "print this string". We also pass to this function a variable in the form of a statement enclosed in parenthesis. So, we have told the compiler, simply, in two statements, nothing more than "DISPLAY AT(8,10): "= = = = = Menu 1.0 = = = = =". The next 8 statements are 4 pairs of incrementing locate and puts statements to complete our initial screen. The next line is our first keyboard I/O function. And now here is your first test: If "puts" meant "put string" and "putchar" meant "put character." What does "getchar" mean?

Answer: "get a character"

Hope you got that right. All getchar does is fetch a character from a keyboard press and passes it to the program. You will notice that, unlike "puts" and "putchar" where the program passes the variable to the function by including it in the parenthesis of the function call, getchar() has no variable passed in its parenthesis. That is because we will get the variable for getchar from the keyboard press not the program. Getchar is nothing more than an "INPUT X" statement in BASIC. Just like in BASIC, the program waits till a key is pressed to go on. Right now, we don't care what key is pressed; only that a key IS pressed. We will look closer at getchar() later in this tutorial. The final function call in the main() function is to call a user-defined function in the program. The next block of code is called "menu()" and, by including the "menu();" statement in main() we thereby pass program control to the next function. Think of it as similar to a "GOSUB" in BASIC. Since we don't have line numbers in C, we call routines by name. (Actually, this is closer to "CALL subroutine" in XB, but

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Listing 1

```
#asm
  REF PRINTF
#endasm
main()
{
        putchar(12);
        locate(8,10);
        puts("=====Menu 1.0=====");
        locate(9,10);
        puts("==A menu-Utility==");
        locate(10,10);
        puts("==================");
        locate(20,13);
        puts("Written in c99");
        locate(21,10);
        puts("(c) 1986 Ron Albright");
        locate(24,13);
        puts("Hit any key...");
        getchar();
        menu();
}

menu()
{
        int c;
        putchar(12);
        locate(1,10);
        puts("==Menu-Utility==");
        locate(5,1);
        puts("[1] Choice 1");
        locate(6,1);
        puts("[2] Choice 2");
        locate(7,1);
        puts("[3] Choice 3");
        locate(8,1);
        puts("[4] Choice 4");
        locate(24,1);
        puts("Your Selection?  ");
        c=getchar();
        if(c<49 | c>52)
            menu();

        putchar(12);
        locate(1,1);
        c=c-48;
        printf("Your choice was %d from the menu ",c);
        locate(24,1);
        puts("Press any key to continue...");
        getchar();
        putchar(12);
        main();
}
```

New OmniLaser continued from page 81

quently restocking paper trays. Resolution is a high 300 x 300 dots per inch, for crisp graphics and word processing that approaches typeset quality. The 2015 has two slots for plug-in font modules. Standard typeface is Courier 10, 12 and 16.7 (compressed) pitch; additional fonts can be downloaded into the standard 512K system RAM.

The 2015 is targeted for environments such as legal and insurance offices, or other business applications that primarily require word processing, with additional requirements for data processing, forms generation and business presentation graphics.

The OmniLaser 2115 and 2108

The OmniLaser 2115 uses the same 15 ppm print engine as the 2015; its powerful PostScript controller is built around the 32-bit Motorola 68000 microprocessor, the same class of microprocessor that drives TI's new Business System 1000 series of supermicrocomputers. With three megabytes of RAM, the OmniLaser 2115 has more computing power than AT-class products, providing enhanced flexibility in layout and design of documents. The 2115 has two font cartridge slots, and optional fonts can be addressed via the font cartridges.

The speed and durability of the OmniLaser 2115 print engine, combined with the power and flexibility of PostScript, makes it an ideal laser printer for shared resource use in such applications as in-house publishing, CAD/CAE workstations and forms generation.

While the 2115 brings high-functionality to the shared resource market, the 2108 serves as a workstation printer for the same graphics-intensive applications. The 2108 has an eight ppm engine with a 10,000 page per month duty cycle, a 600,000 print machine life and a 68000-based controller with two megabytes of RAM.

Pricing and Availability

The OmniLaser 2015 will be available in July from TI resellers at a suggested list price of $5995. The OmniLaser 2115 and 2108, will be priced at $7995 and $5995, respectively.

The OmniLaser Series 2000 printers have industry-standard emulations and interfaces. OmniLaser 2015 standard printer emulations include the Diablo 630, Hewlett-Packard LaserJet, Texas Instruments OMNI 800 Model 855/Qume Sprint 11, and optionally via emulation cartridges, the TI Model 810, IBM Proprinter and HP LaserJet 500 Plus.

RS-232 serial and Centronics-type parallel interfaces are standard. The OmniLaser 2115 and 2108 have Diablo 630, HP LaserJet 500 Plus, TI 855 and Hewlett-Packard 7475 plotter emulations, and interfaces for RS-232, Centronics-type parallel, RS 422 and AppleTalk.

Service will be provided by TI's nationwide network of trained technicians. Service programs include on-site maintenance, key operator training and a customer support line, among others.

Texas Instruments Incorporated pioneered the technology behind its patented semiconductor thermal printing process and the world's first thermal printing, silent data terminal. The company's Data Systems Group also introduced the OMNI 800 Model 810, which has earned an industry-wide reputation for reliability in dot-matrix printers.

For additional information contact Texas Instruments, P.O. Box 809063, H-860, Dallas, TX 75080-9063; (800) 527-3500.

Mention that you read about it in *Computer Shopper*. ●

TIMEX-SINCLAIR

Sinclair Survival Column

by Mark L. Fendrick

Before we get to this month's topic, here is a brief update on the QL situation as it concerns us here in North America.

After the Midwest Sinclair Computerfest, Carol and George Whitham of A+ Computer Response (the new national U.S. distributor of the QL) flew to London to attend the 19th ZX Microfair, and to meet those involved in the Sinclair computer industry. The ZX Microfair is held a number of times during each year and is the showplace for new products for the Sinclair line. This was, of course, the first of these shows held since the sale of Sinclair's computer business to Amstrad. As happened in Cincinnati, many encouraging developments were to be seen.

At least two QL clones are now in development in the U.K. Tony Tebby, the developer of QDOS, in cooperation with Psion, is now developing a computer based upon his operating system. No specifics are yet available. CST, who has been developing upgrades and peripherals for the QL in the U.K., has announced that it is going to market a QL clone named Thor. Thor will consist of the current QL motherboard enhanced with a 3.5 inch floppy disc (some reports include a hard disc as well), 640K onboard RAM and an enhanced version of QDOS. Although no price has been announced, a British computer publication estimates it will sell for about 600 pounds. A+ Computer Response is taking a keen interest in these developments, looking towards feasibility for the American market.

They also met with companies producing software and hardware for the current QL, and will be bringing many new products to market here in North America. In addition, look for much software customized for use in this country.

Furthermore, A+ has initiated negotiations with Amstrad for the possible production of additional quantities of the present model QL. As promised, A+ is committed to raising the level of support for the QL to a one previously unknown in the American Sinclair community.

One thing to be aware of when you buy a QL is whether it is an actual American model, or a British QL with a U.S. power source. Aside from the possibly differences in the ROM, A+ does not warranty the British version.

On another Sinclair front, Amstrad's Director of Marketing, Malcolm Miller, has been quoted as saying that Amstrad would not pick up their option to produce and market the Pandora laptop portable. "Pandora is not Amstrad's type of product," says Miller, "and lacks the appeal we require." Word is that at least two companies have expressed interest in the Pandora. *Computer Shopper* will continue to keep you posted as developments occur.

A few months ago when we were discussing the suite of programs which comes with the QL, I mentioned that the database software was more than a simple filing program, but in actuality a programming language. (One rapidly growing company we know is running an entire point-of-sale system—stock control, order entry, invoicing, mailing list etc.—using ARCHIVE procedures which they created.) This month we will take our first in-depth look at ARCHIVE and put together a simple address book type listing.

The first thing you should do before you try the procedures which we discuss here is to follow the example given in the ARCHIVE section of your QL User's Guide, using the world gazette database as a demonstration. This will give you an idea of how the program can be used as a simple filing tool. It is fine for this purpose, and you only need to learn the commands listed in the screen prompts (help files are available on line of course) and use them in the "immediate" mode. However, to truly unlock the power of ARCHIVE, you will have to do some programming. Depending on your abilities and needs, this can be either simple or complex.

We are going to design our address book with fields for first name (fname$), last name (lname$), street address (street$), city (city$), state (state$), zip code (zip$), area code (area$) and telephone number (telno$). area code (area$) and telephone number (telno$). With this information in hand, we will first design our screen.

You enter the screen edit mode by typing **sedit** at the > prompt. If you have anything on the screen, the first thing you will do is clear the screen. This is accomplished by pressing **F3** and then pressing **C**. You will notice that as in all of the Psion programs that come with the QL, **F3** is used to get to each command level.

```
PERSONAL ADDRESS LISTING
FIRST NAME : ..............................
LAST NAME : ...............................
STREET ADDRESS : ..........................
CITY/STATE : ..............  ZIP : ..........
AREA CODE : .....  TELEPHONE # : ........
```

Fig.1

Figure 1 shows the basic set-up which I use for my address listing using ARCHIVE. (Do not type in the dots just yet. They will come into play when we designatte the variables.) If you are using a color TV or color monitor, you might want to make use of the color commands available after pressing **F3**. In my case, the paper color is always black, while I use red ink for the screen heading and green for the field designations. When it is time to define the entry fields (the dots in figure 1) we will use white ink. Of course, you are free to use any colors which suit your needs, and may have to modify my choices if you are using a monochrome monitor.

Once you have designed the screen the way you want, you will need to designate the entry fields of each variable you are using. You do this by moving the cursor to the spot which you want to start the entry field. Press **F3** and choose **V** to set the variable. You will then be asked for the name of the variable (see the list above) and finally asked to specify the length of the permitted entry. (This is where the dots shown in figure 1 are entered.) Be sure that if you are going to print labels that you do not make any field (or set of fields which will be printed on one line of the label) is not longer than permitted by the size of the labels you will be using. Make sure that each field has one character more than your required entry—to accommodate the <CR> which ends each entry. Figure 1 allows for the zip + 4 zip code, and possibly an extension if the telephone number is a business number.

If you make a mistake in creating the entry field, just repeat the procedure only instead of creating a new field, you will be asked if you wish to delete the existing field. Once you have eliminated the offending entry, just repeat the steps outlined above.

Once the entire screen is designed to your satisfaction, make sure that you save it for future use. (In all examples in this article we will assume that you are using microdrive number 2 to store data. If you have an alternate mass storage device, just substitute that for the proper destination device.) First press **ESC** to leave the screen edit mode. Once you see the > prompt type; **ssave "address."**

Now comes the time to actually set up your database by creating the files you will be using. Type **create "address"** followed by ENTER. This opens a file named "address" to which data can be written. Then one by one enter fname$, lname$, street$, city$, state$, zip$, area$, and telno$. Finish this process by typing **endcreate** and you are ready to start making entries into your newly created database. You are limited only by the memory of your QL and the capacity of your storage medium.

Although you can order your files at any point, now is a good time to do it so each new entry will fall into its proper position. The most common way to do this would be to alphabetize by last name (lname$). To this you type **order lname$;a** at the > prompt. This will sort according to the last name in ascending order—A to Z. Changing the a to d would sort your files in descending order. If, however, you wanted to order your address list by acending zip codes and alphabetically within a zip code, you would type **order zip$;a,lname$;a.** When we write our listing and label print procedures, you may want to include these commands if you need your listing in alphabetical order and labels in zip code order — as required for bulk mailings.

Now you can start making your entries by first typing **>insert** and then making the entries as indicated by the cursor. Pressing either **TABULATE** or **ENTER** will advance you to the next field. To move back a field press **SHIFT/TABULATE.** Pressing **ENTER** after the last field will enter that file and move you to enter the next. When you have made all your entries, press **F4** to end your entry session.

So far, we have used ARCHIVE as simply a program designed to store some data, but we have not really customized it for our particular need other than designing a screen. Let's write a few simple procedures which will help us to use this address listing which we are creating.

This is done by writing a series of **procedures** using the instruction set available with ARCHIVE. We start out by typing **edit** and writing a **procedure** which is called **start.** It is necessary that any procedure which you want to run automatically must be called **start.** You may call other **procedures** from this one, but in our example we will use it to 1) load the screen which we have created, 2) activate that display and 3) open our address file.

```
proc start
sload "address"
scree
open "address"
endproc
```

Your first line starts out with the word **proc** which preceeds the procedure name. When you type **run "address"** at the > prompt, ARCHIVE will automatically seek a procedure named **start** and carry out the instructions found therein. When this procedure is initiated, we will see our screen with the first entry displayed.

Procedures can be called from the > prompt by name, and the name of the next procedure will be **list**, and will be

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Sinclair Survival continued from page 3

the routine used for producing a hard copy of our address list.

```
proc list
let n = count()
let pg = 1
first
while n
lprint tab 14;rept("-",52)
lprint tab 14;fname$;"
";lname$
lprint tab 14;street$
lprint tab 14;city$;", ";state$;"
";zip$;
lprint tab 47;"(";areacode$;")
";telno$
let n = n-1
let pg = pg + 1
if pg = 16
new_page
endif
next
sprint
endwhile
lprint tab 14;rept ("-",52)
lprint
lprint
lprint tab 35;count();" entries"
lprint tab 30;date(2);" ";time()
endproc
```

The first two lines are simply to initialize the two counters which we will use to control the format of the printout. The variable count() holds the total number of files currently in the database. By setting n to count() and subtracting 1 each time a file is printed, we have a simple way of telling when all of the files have been printed. The variable pg in the next line will be used to ensure that no entry is printed which would overlap the perforation on a standard 8½x11 inch page. In the format we will design here, 16 entries are allowed before a new page must be started. This variable will be incremented by one with each printing, and when 16 files have been printed, **proc new_page** will be called. The final initialization is represented by the command **first**. This command brings the listing to the first entry in the database.

The actual printing takes place in the loop which is initiated by the line **while n.** As long as the value of **n** is positive the loop will continue to print entries. The last entry will cause the value of **n** to be zero, thereby ending the print loop.

The next five lines are the actual file printing routine. Notice the first line of this sequence. In ARCHIVE if you want to print a repetition of a single character, rather than putting many repetitions of that character in a PRINT command, the **rept** command may be used. In our example, we are printing 52 consecutive "-" characters.

Notice that unlike SuperBASIC, which requires that you open a channel to the printer and use the PRINT # command, ARCHIVE supports the familiar lprint. The following 4 lines print the data you have entered.

Once the file has been printed, the file count (**n**) is decremented by one and the **pg** variable is increased by one. If **pg** reaches 16, the new page proc is called. You will note the line **endif.** Each **if** line must eventually be followed by an **endif.**

The next two lines are ARCHIVE commands. **Next** advances the database pointer to the next entry in the file, and **sprint** causes that entry to be printed to the screen. If you are not at the end of your listing, you are now ready to loop back to repeat this whole routine. **Endwhile** indicates the end of the loop which started with the **while** statement. Each **while** must have a corresponding **endwhile.**

Once you have printed the final entry, the last routine prints the number of entries and the date and time. (You must set this before you enter ARCHIVE.) ARCHIVE gives you a number of different options on how to print the date and time. Check the ARCHIVE section of your QL user's manual for that information.

Finally, all **procedures** must be terminated with an **endproc.**

```
proc new_page
lprint tabe 14;rept("-",52)
lprint chr(0) + chr(12)
let pg = 1
endproc
```

The new-page proc is required to print a line of "-" and then send a form feed command to the printer. My Gemini 10X requires that an ASCII code 12 be sent to perform that task. Note that unlike SuperBasic, the prefix is **chr** *not* **chr$**. Also, before you can transmit a non-printing function code, you must send an ASCII code 0. Once that is accomplished, **pg** is set back to 1 to count off another 16 entries before another form feed is sent.

```
proc labels
let n = count()
first
while n
lprint fname$;" ";lname$
lprint street$
lprint city$;", ";state$;" ";zip$
lprint
lprint
lprint
let n = n-1
next
sprint
endwhile
endproc
```

Remember that if you need a different order for your labels than for your listing, you may either include the **order** command in your proc, or enter it directly from ARCHIVE at the > prompt. Once you have all of your procs typed in, press **ESC** to leave edit mode, and then at the > prompt, type **save "address".**

A final reminder which you must remember whenever you use ARCHIVE. Your files must always be closed when you are finished with them, or you risk loss of your data. It is a good habit to get into; to both close the file by typing **close** at the >, and to always end your ARCHIVE session by way of the **quit** command. If any files have accidentally been left open, leaving ARCHIVE in this manner will automaticaly close them. Also don't forget to make a backup copy of your data onto another cartridge. There inevitably comes the time when this habit will save you time and aggravation.

This was only our first look at ARCHIVE, and we have only just scratched the surface. In the future, we will look again at this QL database software. If you have created a database of a different sort using ARCHIVE, drop me a line in care of *COMPUTER SHOPPER* and tell me about it.

Finally, our apologies to John Richard Coffey of JRC Software (P.O. Box 448; Scottsburg, IN 47170) for neglecting to mention that he too was an exhibitor at the Midwest Computerfest. Known for his graphics programs, JRC was showing its new game, Diamond Mike, for the T/S 2068.

Next month a look at the first QL programs written for the U.S. market by American authors.

```
proc labels
let n = count()
first
while n
lprint fname$;" ";lname$
lprint street$
lprint city$;", ";state$;" ";zip$
lprint
lprint
lprint
let n = n-1
next
sprint
endwhile
endproc
```

```
proc list
let n = count()
let pg = 1
first
while n
lprint tab 14;rept("-",52)
lprint tab 14;fname$;"
";lname$
lprint tab 14;street$
lprint tab 14;city$;", ";state$;"
";zip$;
lprint tab 47;"(";areacode$;")
";telno$
let n = n-1
let pg = pg + 1
if pg = 16
new_page
endif
next
sprint
endwhile
lprint tab 14;rept("-",52)
lprint
lprint
lprint tab 35;count();" entries"
lprint tab 30;date(2);" ";time()
endproc
```

```
proc new_page
lprint tab 14;rept("-",52)
lprint chr(0) + chr(12)
let pg = 1
endproc
```

```
proc start
sload "address"
screen
open "address"
endproc
```

●

FREE CONTEST

by Dr. Michael W. Ecker

The publisher of *REC*, The Recreational and Educational Computing Newsletter, announces that it is having a free contest and a free sweepstakes open to subscribers and non-subscribers. Although no purchase of any kind is necessary, winners who are subscribers will receive larger, more valuable prizes. The contest will be a skill one, but the sweeps will be decided by random drawing.

Prizes include one or more computers (including Radio Shack and/or Spectavideo and/or Commodore, among other possibilities), hardware and/or software, free subscriptions to the newsletter, and choice of cash or savings bonds, with publication of the wining entrant's name (and, for the contest portion, winning idea or program). Beyond the initial prizes, the actual number and value of cash and home computer prizes in both will be increased proportionally to the number of subscribers generated.

According to Dr. Michael Ecker, the editor and publisher, "We're running it for two reasons: First is to have a little educational fun for everybody, for that is part of what our newsletter is about. We all know that people enjoy contests and sweepstakes. Second, we run this as a promotion to increase awareness of *REC* in the computer, recreation, education, and math ematics communities. We're a new computer-related publication not devoted to any particular computer, and we'd like more people to become familiar with us."

If the contests are successful in attracting attention, two more are planned over the next year and a half. In addition to prizes drawn from Dr. Ecker's extensive personal collection, major companies have been solicited to offer prizes as well so that winners will be able to have their choice of prizes most to their liking, or compatible, if they already have their own computers.

The newsletter is published six times per year and costs just $18.95 for an annual subscription; sample issues are $3.50. *REC* is dedicated to "mathemagical" number fun, computer investigations and explorations, problem solving, programming, and more. It is designed to fill some of the void created by the folding of *Creative Computing* and *Popular Computing* magazines last year.

The first two issues of the new newsletter included material on number sequences and next number, self-listing and self-reference, computer simulations for collections, narcissistic numbers, strange attractors and black holes, bingo probabilities by computer, book and software reviews, and more.

To enter the sweepstakes portion and get rules for the contest portion, as well as to subscribe or get information about either the sweepstakes or *REC*, readers must send their name and address, and computer brand (if any), with a self-addressed, stamped return envelope to: *REC* Newsletter's 1st Sweepstakes, c/o Dr. Michael Ecker, 129 Carol Drive, Clarks Summit, PA 18411.

Sweepstakes entry deadline is Feb. 1, 1987. Drawing to be held Feb. 2, 1987. Winners will be contacted, and their names and addresses will be announced in *Recreational & Educational Computing Newsletter*. The judge's decision is final. ●

HEATH/ZENITH

Expanding Your Heath/Zenith PC

by Ted Drude

This month we've got a variety of topics, with something for just about everybody. If you've tried, without success, to speed up the CPU of your H/Z-150 (or other PC-compatible) from 4.77 to 7.37 Mhz, then be sure to read the review of the new TurboPlus speed up module. It solves the speed problems affecting most other turbo boards.

One of our readers, David Hart, has some good tips on adding an 80 track (96 tpi) 5¼" drive to your H/Z-150. If you're interested in increasing your floppy storage to 813K per disk, check his letter.

Our February column, which reviewed several CP/M emulator programs, is barely six months old. Yet there have been a lot of changes in that short time. We'll be looking at an updated version of a program previously reviewed in Beta-test form: Micro Interface's RUN/CPM.

We'll also be reviewing, Decmation's new Z-80 coprocessor board. Longtime Z-80 users who are thinking about upgrading to a PC compatible should find this interesting.

Wanted: An Inexpensive Z-80 Board

Although I like the high speed (and low cost) CP/M emulation available with the NEC V-20/30 chips, I'm also the first to admit they have their limits. The biggest limit is that they only run 8080 software. While many older CP/M programs will run fine on the 8080, most current development is directed toward the Z-80 (because of popular Z-80 machines like Kaypro, Osborne, Epson QX-10, and H/Z-89/89). If you want to run many commercial and public domain programs written for CP/M over the past few years, you've got to have Z-80 compatibility.

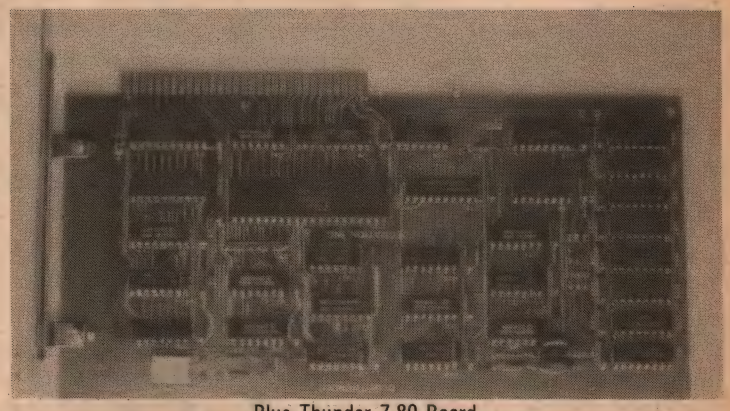
Of course, there are several ways to get Z-80 compatibility on a PC compatible system. If there were a CPU chip that ran both 8088 and Z-80 software, the whole problem could be settled by simply installing a new chip. Unfortunately, such a chip does not yet exist. I've mentioned rumors of a new NEC V-chip that fits this description, but with Intel's lawsuit still pending, it may be a while before we see it (if ever).

You can also emulate a Z-80, in software, on the 8088 chip. We've previously mentioned ICU's CPEM, Gtek's CPEmulator and Joan Riff's Public Domain Z80MU, which are all attempts to do this. (Yes, Z80MU is still available on disk for $5.00 ...info at end of the article.)

It's amazing how many Z-80 programs these software emulators will run, but they still leave a lot to be desired in the way of speed. They usually provide the equilvalent of 250Khz (¼ Mhz) to 1 Mhz Z80. Compared to V-chip emulators, it's quite a stepdown in performance. Right now, the only way to get reasonably fast performance is to install a Z-80 co-processor board.

There have been several Z-80 boards for the PC-bus. One of the first was the Baby Blue board. Originally, these boards were marketed as a stopgap measure, because 16 bit software, at first, was a little slow in coming, and many business programs were only available in CP/M. These boards have since become very popular with software developers who are using the PC environment as a Z-80 development system. As I've mentioned previously, the relatively high cost of these boards ($500-$1000) keep them from becoming widely accepted among average PC users.

Decmation is one of several companies currently making Z-80 coprocessor boards.



Blue Thunder Z-80 Board

While they're best known for their CP/M, MS-DOS, and ISIS emulators for the DEC PDP and VAX minis, they also produce the Blue Lightning coprocessor board for PC compatibles. It has a 9Mhz Z-80, 128K RAM, and is bundled with SLR's fine Z-80 Macro Assembler.

Blue Lightning sells for $595, which is reasonable for serious development work, but still fairly high compared to most V-chip emulators. Decmation realized this and developed a more affordable Z-80 board, for less demanding

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Videotape Your Computer Graphics

by Peter Ruber

If you like to dabble in computer graphics and have a VCR at home, why not combine the two for some practical personal and business applications?

A new computer application isn't always the result of weeks of ponderous thought. Sometimes the idea strikes quite casually. And, if it's simple and inexpensive to boot, that's even better.

A few weeks ago, my off spring informed me that one of our neighbors was using a VCR camera to film opening title screens for his kids' cassette library after spending hours drawing and coloring the artwork. Thinking this was "neat," they suggested I run out and spend a thousand bucks for a camera. Their cure-all for acquiring costly gizmos is "write a check."

"Use your computers," I told them.

But after thinking over my suggestion, they concluded it was silly. There was no way of getting a computer image onto videotape without a camera. Not to be outwitted by their devious intentions, I took one of their Commodore 64s and hooked up the composite video output to the video input of the VCR. I set up a fresh cassette tape, pressed PLAY/-RECORD, and set the PAUSE switch to OFF.

I loaded one of several graphic programs and drew a simple picture. When I was satisfied with the results, I toggled the PAUSE switch to ON, and let the image record for a few feet. I rewound the tape and played it back through the TV. I knew I had the little devils hooked, and they couldn't wait to start creating fancy graphics and lettering that looked more professional than the home-brew art their friend was preparing.

Needless to say, I had created a monster, because they're now working on stop-motion animation and kaleidoscopic effects with a relentless passion. In the process they stopped nagging me about buying a VCR camera, and quickly passed on their newly-acquired trick to their friends who had Ataris and Apples.

Can We Do It On A Heath/Zenith?

I have been thinking about transferring computer graphics from my H/Z systems to videotape, but other projects always intervened. Now, seeing how easily it worked on a Commodore-64, I suspected that I would have no major problems using my computer equipment, and decided to put things to a test.

All you need is a composite video-out connector on your computer and a standard RCA-type audio cable. Run the cable from the computer's video-out to the video-in on the front of your VCR. The recording operation is the same as described above.

You have a certain built-in advantage for creating videotape copies of your computer graphics if you own any Heath/Zenith PC compatible computer or the Z-110/120 computers. These have composite video-out connectors on the back at your disposal. If you are using either an RGB or monochrome monitor on the PCs (or an RGB monitor on the '110/'120) simply connect the composite port to the VCR. But if you are already using either a composite amber, green or color monitor, simply disconnect the monitor from your computer, plug the cable into the video-out on the VCR, and then connect the computer's video-out to the VCR's video-in. This will allow you to continue using your monitor.

The H/Z-89 and H-8 (with an H/Z-19 terminal) do not, of course, have any composite video-out connectors to work with, but we have a couple of alternatives to consider.

The first is a composite video port from Magnolia Microsystems. This is an inexpensive little board that mounts on the Terminal Logic Board of either the '89 or '19. It costs around $79 and is simple to install. Remove the backplane of the '89 or '19 and the TLB. You remove one IC, plug in the socket from one end of the ribbon cable and replace the TLB.

Plug the other end of the cable into the Magnolia board and mount it on the backplane. If you have a Magnolia backplane which provides additional cutouts, your installation is simplified. But if yours is the standard H/Z backplane, drill a .50-inch hole.

The video-out on Magnolia's composite video board is in the form of a coaxial 75-ohm BNC-type connector. A BNC cable is a standard accessory with all VCRs, and it's generally used to connect the VCR to your TV. Use this or buy an extra one at a video store.

If you want the versatility of color, you can purchase (for

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uses. Their expertise has helped them create a new board with lots of power at a very reasonable price.

Decmation's Answer: Blue Thunder

Decmation's new Z-80 board, Blue Thunder, clearly shows it's heritage. It's fast and powerful, yet priced at only $199, and is very price competitive with some of the V-chip emulators.

Blue Thunder's Hardware

The Blue Thunder board is half-slot length. On board is a 5Mhz Z-80B microprocessor and 64K of dedicated RAM. The construction of the board appears to be of high quality and is warranted for 90 days. Unless mishandled, it will probably provide years of trouble free service.

The Blue Thunder board is simple to install. Just insert it into an open slot and secure it with a filler panel screw. You don't need to add any jumpers or internal cables. Because it's half-slot length, it should fit nicely into machines like the Tandy 1000 and half-slot H/Z-148s.

The board is memory-mapped, for fast I/O, through a 16K block at $C4C00 - C4FFF. If you are already using that block of memory, you can re-assign it to a higher address with a simple jumper which is described in the 30 page user's manual.

Blue Thunder's Software

Also part of the Blue Thunder package is the necessary CP/M support software. This includes a CP/M emulator, Kaypro terminal and disk emulation, and several utility programs.

The emulator provides the equilvalent of a CP/M 2.2 environment, including BIOS, BDOS, and CCP. The CCP emulator has most of the normal CP/M built-in commands including DIR, ERA, TYPE, and REN. You can also access any MS-DOS command (CD, COPY, DEL, etc.) or run an MS-DOS program, from the CCP prompt, by simply prefixing it with a comma. While running the CP/M emulator, you can also have memory resident MS-DOS programs (SideKick, etc.) in the background.

Like most other emulator programs I've reviewed, all the host system's hardware is accessible by CP/M. That means hard disks, RAM disks, and floppy disks can be addressed as CP/M drives. There is no need to partition drives for separate CP/M and MS-DOS files, they can both exist as MS-DOS files.

In order to prevent confusion, 8-bit binary CP/M files are renamed with an extension of ".CPM," instead of the normal "COM," (which is reserved for MS-DOS files). In case you forget to rename files with the new extension, the CCP emulator goes a step further by analyzing files before executing them, to determine if they are Z-80 or 8088 programs.

The software is also a binder function that allows you to create stand-alone CP/M programs. By binding a header to an 8-bit file, you can run it from the MS-DOS prompt, as though it were a 16-bit program. This makes it easier to run individual CP/M programs.

Kaypro Terminal and Disk Emulation

Built into the CP/M emulator is terminal emulation providing a combination of an ADM3A, Kaypro, and Televideo 950 screens. I found it to be very accurate and fast. A configuration utility is provided that allows you to bypass this emulation, if desired, and use the MS-DOS ANSI.SYS driver instead.

Included with Blue Thunder is a unique floppy disk device driver that acts as a conversion program. When installed, it allows you to read, write, and copy most Kaypro formatted disks through the PC compatible's drive, using either CP/M or MS-DOS commands. This approach speeds up the software conversion process greatly. (Unfortunately, I couldn't get this to work properly with my Z-150, when running MS-DOS 2.11.)

Utilities Provided

Decmation has also provided several utility programs to emulate or replace many of the normal transient CP/M utilities. This includes a public domain 8080 assembler similar to ASM.COM (LASM.COM), a nice SUBMIT facility (including XSUB), and replacements for SAVE and LOAD. These utilities are essential for serious CP/M work, especially programming. Most other CP/M emulators I've run across do not provide transient replacements, and this can be a hindrance when doing advanced CP/M work.

One transient still missing is a replacement for DDT.COM, the software debugger. Decmation does include a very nice commercial debugger with their more expensive board, but not with Blue Thunder. For disassembly purposes, there are some public domain programs (like Resource, Zesource, and DazzleStar) that can replace DDT. But the run-time monitor functions, of DDT are hard to replace without a commercial program like SID or ZSID.

Software Compatibility

Most CP/M BIOS and BDOS calls are supported, with the exception of direct hardware calls. The emulator program ran a Z-80 code I threw at it, including some public domain programs that are known to be especially tough to run. I was even able to run programs that use undocumented Z-80 opcodes, and which normally crash software Z-80 emulators.

Decmation states that a PC compatible using Blue Thunder was able to run most software bundled with a late model Kaypro 2X that didn't make direct hardware calls. The programs that ran included utilities like PIP, ASM, DDT, MASMENU, SUBMIT, LOAD, and application software like Wordstar, MailMerge, Datastar, Calcstar, Reportstar, The Word Plus, and MBASIC. (Although not mentioned in the user's guide, DBase II, SBASIC, and CBASIC also ran fine.)

While Blue Thunder's Z-80 can't directly address the PC's hardware ports, two new BDOS calls have been added to the CP/M emulator which allows access through software. It may be possible to modify some CP/M programs to make these calls and access the PC's hardware directly.

Performance Benchmarks

When compared to the V-chip software emulators, Blue Thunder has a distinct speed advantage. This is especially true in the number crunching tasks. For example, the Sieve of Eratothenes prime number benchmark ran on a 4.77Mhz V-20 chip in 62 seconds. That

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about $299) a color graphics board from New Orleans General Data Systems. Two models are available—the H8-3 for the H-8 computer and the H89-3 for the '89. They may seem a bit pricey, but they offer more than just color graphics and sound. Both boards have been around for about five years and are very reliable. The documentation and the programmer's package is excellent and is available in both CP/M and HDOS versions.

Both versions plug directly into their respective computers and ribbon cables are supplied so that you can tap the video-out signals from the proper connector. The cable can then be run to a standard composite color monitor or to a color TV through an RF converter.

HUG and several software vendors offer color graphic software packages at reasonable prices that will enable you to create some moderately-intri-cate designs. Any designs of a more sophisticated nature would have to be written with the aid of the programmer's package. Modules for various graphic routines are supplied which can be incorporated into all popular high-level programming languages.

Hi-Res Graphics On The '89 & H-8

For high-resolution and even interlaced mode graphics for the '89 and H-8, there is the Interrative Graphics Controller Card from SigmaSoft & Systems. Since I reviewed this product in the August, 1985 issue of *REMark*, I won't dwell too long on the IGC, except to say that you will need the Magnolia composite video board to give you a composite video-out image for a VCR.

The IGC is a piece of high-tech hardware with its own graphics language that is easy to implement even for novice programmers, because executable routines can be created with a simple text editor. The IGC can be expanded to 256k RAM and it comes with numerous drivers for hard-copy versions of your artistic endeavors, as well as a print-spooling driver. The IGC is primarily an extension of the '89's TLB, so it is equally at home inside an H-19 with an H-8.

It is also compatible with the H-1000 (Technical Micro Systems) and Super-89 (D-G Development) replacement CPU boards. Software is supplied for standard Heath/-Zenith CP/M and HDOS, as well as versions for the Controlled Data Recording Systems and Magnolia versions of their CP/M BIOS.

There are other graphic boards for the '89 and '19 available from Northwest Digital Systems and Cleveland Codonics, but they lack decent software support, and are therefore not on my personal recommendations list. They require a lot of programming effort to achieve minimal results.

H/Z-100 and H/Z-PC Graphics Support

There is a lot of good graphics software floating around for both of these machines that can be used for purposes other than mere personal entertainment and doodling. Some of the better graphics packages for the PCs come with "rodent" devices that enable you to draw with relative ease.

Most of the newer "integrated" software packages like Lotus and Symphony come with graphic utilities for creating charts of all kinds. The usual application has been to make slides of these charts for business reviews and presentations. This is, of course, time-consuming and, unless you have the proper photographic equipment, a bit iffy in terms of quality.

If speed of presentation is important, and if graphics depicting the results of past years' sales achievements need to be demonstrated quickly, the abilities of these computers to correlate data and translate them into a variety of graphic illustrations is certainly a time-saving factor if they can be dumped directly to videotape by the operator.

A videotape record of any kind of graphic data is also helpful in business applications when people not familiar with computers need to reference the information in your computer.

Summing Up

This article was not meant to be a definitive statement on the use of videotape and computer. I have tried merely to show you that it is possible to use your VCR as a storage medium for business data and graphics, for personal experimenting and as a learning experience, and how to interface a VCR to most Heath/-Zenith computer systems.

I'm certain once you begin applying your own imagination to your computer and VCR that you will find many more applications than I have mentioned.

Products mentioned in this article:

Magnolia Microsystems, Inc., 4039 - 21st Avenue West, Seattle, WA 98199.

SigmaSoft & Systems, Inc., 17000 Dallas Parkway, Suite # 207, Dallas, TX 75248.

New Orleans General Data Systems, 7230 Chadbourne Drive, New Orleans, LA 70126.

Technical Micro Systems, Inc. 366 Cloverdale, Ann Arbor, MI 48105.

D-G Electronic Developments Co., 700 South Armstrong, Denison, TX 75020.

Graphic Software for use with the New Orleans General Data Systems color boards:

Heath/Zenith Users' Group, Hilltop Road, St. Joseph, MI 49085.

Polybites, 3427 Bever Avenue, S.E., Cedar Rapids, IA 52403.

William D. Elkins, P.O. Box 295, Pooler, GA 31322.

Colorworks, 5227 E. Bellevue Ave., Tucson, AZ 85712.

Micro-Doc, 3108 Jackson St. Bellevue, NE 68005. ●

SANYO

The Silver Box

by Richard Fujita

Is V20 Better Than 8088?

One of the very significant developments in the computer world in recent years is the coming of the NEC V series CPUs. You should know that the Japanese have concentrated on building a somewhat limited line of products. The 256K and 1 megabit DRAMs are a good example. These products were built using the same but somewhat refined technology used to build the 16K DRAMs pioneered by the American companies.

NEC and all other Japanese companies could not sell many other products, because the CPU market has always been dominated by Americans. Now NEC is trying to change that with a series of CMOS CPUs based on a refined existing technology plus a little innovation. The V series uses an enhanced Intel 8086 code set to which they added a few new instructions and the 8080 codes (which may be extended to include the Z80 codes as well). The 8080 code set makes V20 run CP/M programs at a normal speed, unlike the CP-Emulator for the IBM PC, which is very slow by nature.

There are some new code groups in the V20. The enhanced stack operations facilitate writing very fast Pascal and Forth compilers in association with the all new packed-BCD instructions. The other new instructions including REPC/REPNC may not have an impact comparable to the above enhanced instructions. I want to predict a huge success of the V series CPU which is just a step or two ahead of the 8086/8088. The V40 is a V20 integrated with at least 10 peripheral chips including DMA and Interrupt Controller. The V60 is a slight departure from any of the earlier V series. It has a unique set of 119 instructions with 273 commands besides V20/8088 emulation mode. It has 16 bit external Data Bus with 32 bit internal bus and thirty two 32 bit general purpose registers in addition to 26 dedicated registers, plus 6- step-4-command prefetch-processor in which four commands are prefetched and executed in parallel. Running at 16MHZ clock, the V60 has 3.5 MIPS (Million Instructions per Second) speed.

Even without uniqueness, the usefulness of this series of CPUs is very high indeed. I do wonder why Intel did not come up with a better product than this long before NEC did something about it. Intel has spent an enormous amount of money and time in the now defunct IAPx32. Why then, a small portion of this time and budget cannot be used on improving a successful product to become a formidable product? Is it a matter of arrogance on the part of American manufacturers or the fault of over subservient Japanese companies?

The V series is right on the line of Intel 8086 with nothing but a few relatively simple improvements (if you exclude the V60), and yet, it will no doubt overtake and eclipse the Intel CPU.

The V20 In Your Sanyo

The most benefit you will get using the V20 in your Sanyo computer is not the speed unless you purchase the Michigan Software's "Speed Board." Rather, the speed improvements may force you to adapt a patch to your programs. For instance, in some Sanyo programs, a type of code sequence used to generate timing may cause some difficulties to users. Most notably a number of "AAM" instructions used in most of floppy disk interface code to keep the speeding CPU in pace with the slower Disk Controller chip may cause trouble because the V20 executes them too fast.

For this stream of AAM instructions, the V20 spend only 18% of the time required by 8088. The V20 shows more than five fold improvements in speed in executing the "AAM" instruction, but in average the V20 may have 10% to 20% improvements only in execution speed.

The biggest merit of the V20 for the Sanyo is its low power operation. Since the Sanyo 555 has a limited capacity in power supply, you need to conserve the power if you want to add anything to your system, whether it is a color board or memory expansion. The V20, which is formally designated by NEC as uPD70108, has considerably lower power consumption. It feels almost cool to your finger while the Intel 8088 is too hot to touch. The Intel 8088 draws maximum 340 milli-amperes according to the Intel catalog specification. The uPD70108-8 draws typically 40 milli-amperes at 8 MHZ and 30 milli-amperes at 4 MHZ, according to the NEC product specification. The Intel chip I have in my Silver Box draws 315 milli-amperes in operation. The V20 chip I have measured was drawing only 27 milli-amperes placed in the same socket.

I consider that the Intel chip shipped with my Sanyo 555 draws a little too much current, although the value is within the published spec. However, the difference of 288 milli-amperes is too large to be ignored. The Intel 8088 dissipates 1.7 watts. The V20 consumes 0.135 watts. This difference may show up as make or break in a hot summer day, especially if you are using the Farrow "Speed Board" distributed by the Michigan Software.

One little known advantage of CMOS chips like V20 is the relative immunity to the supply voltage. They normally have larger noise margin than the TTL, or the NMOS to a less extent, and less likely affected by the supply voltage fluctuations.

The other advantage of the V20 is when using the "Speed Board" in combination with other boards, one most often used is the Tampa Digital's "Missing Link" which has expansion memory beyond 640K limit and equipped with a quartz clock. These add-on boards use Ready signal line and this is where some problems may start.

In certain combinations of boards, (especially when you have the old Main Board in your computer as I do) the chance is that the computer hangs when the CPU executes some input/output routines involving slow responding circuits. One example is the low power CMOS clock chip.

In order to synchronize the steps, the CPU must wait for the slow ones to catch up and this is done by generating a Not Ready signal on the Ready signal line. A subtle timing error can halt the CPU forever depending on the design of the Ready signal generating circuit.

Suppose the CPU addresses the clock chip and reads the contents of a register in the chip. A low power CMOS Clock chip functions very slowly. The speeding CPU must wait for the chip to respond, until the desired data appear at the data I/O pins. Then, the CPU is able to read the data successfully. The hardware is usually wired to generate Not Ready signal when the target chip is selected, and the signal is cleared after predetermined number of clock cycles.

In some designs a curious condition may arise. If the Not Ready signal clears immediately after detection timing, the race begins. The 8088 CPU is held up and it needs another clock to detect the Ready signal line status. This means it continues to address the same I/O port keeping the slow chip in the select condition.

If the Not Ready signal generating circuitry can re-establish itself by the next detection timing a full clock cycle later, the Not Ready condition becomes permanent and the system hangs up. I was led to believe that the V20 has slightly different timing that alleviates this problem, but I have not tested this yet. This problem is a very interesting one and will be discussed again some time later, when my Silver Box regains its composure and when I find the time to do it. I have at hand a good quantity of V20-8 arrived recently from Japan and these will be tested with the "Speed Board" in combination with the "Missing Link" to see what improvements we can expect from the V20.

One other good feature of V20 is its ability to run the CP/M programs without the slow 8086-8080 Translator. This advantage will be discussed in the next article.

So far we investigated the good part of using V20 in our Sanyo. What about problems we might have? The question will be reported in the future Sanyo Column of the *Computer Shopper*.

The V20 Instructions

The V20 has 16 so called enhanced instructions, 14 unique instructions, and three special instructions which are used in 8080 mode (total 101 instructions for the V20/V30 and 94 for the 8088). The codes in the last group are BRKEM (a Mode Change Interrupt Code with immediate operand to designate the Interrupt Number: 0FFFH + Interrupt Number you are using to specify where to dump),

continued on page 203

```
                              LIST  1.

     A SIMPLE TEST TO SHOW HOW TO HANDLE 8080 MODE OF THE V20.

A)[DEBUG ret]

-

(NOW  TYPE [R ret].  THIS WILL SHOW YOU THE CURRENT  SEGMENT  YOU

ARE  USING.  LET'S CALL THE FIRST TWO FIGURES AS 'segh'  AND  THE

RIGHT-HAND  TWO  FIGURES AS 'segl'.  NOTE THE CONTENTS  OF  AL  IS

'00'.

-[ E0000:0200 ret ]

0000:0200     00.[so]  00.[02 ret]  00.[segl]  00.[segh ret ret]

-[a100 ret]

XXXX:0100 [MOV BP,SP ret]      ;BP BECOMES SP IN 8080 MODE
;(XXXX is your current Segment)

XXXX:0101 [DB  0F ret]    ;THE FIRST BYTE OF BRKEM CODE
XXXX:0102 [DB  FF ret]    ;THE SECOND BYTE
XXXX:0103 [DB  00 ret]    ;THE THIRD BYTE SPECIFYING INT #
;(The Interruot Number 00H  corresponds to 0000:0200H in memory.)
;(The CPU picks up the jump address at 0000:0200H and starts)
;(CP/M mode execution.)
XXXX:0104 [INT 3 ret]     ;DISPLAY REGISTER INTERRUPT OF DEBUG.
XXXX:0105 [ret]

-[a200 ret]
XXXX:0200 [DB  3E ret]    ;THE CP/M CODE FOR MOV A(L), imm.
XXXX:0201 [DB  FF ret]    ;LET'S USE 'FF' AS TOKEN.
XXXX:0202 [DB  ED ret]    ;THE FIRST BYTE OF RETEM CODE.
XXXX:0203 [DB  FD ret]    ;CPU RETURNS IN 8086 MODE.

-[G=100 ret]

;(THE CPU NOW SHOW THE CONTENTS OF THE AL REGISTER AS 'FF'.  THIS
IS  THE INDICATION THE V20 HAS EXECUTED ONE OF 8080  INSTRUCTIONS
AS IT SUPPOSED TO DO.)
```

IT FIGURES
An IBM/Sanyo Calc-Sheet

by Fred Blechman

One of the most influential programs written in the early days of microcomputing was "Visi-Calc," a program that allowed an Apple II to display and print a "spreadsheet" of vertical "columns" and horizontal "rows" of numbers, and then perform calculations on each "cell." It simulated the traditional worksheets used by accountants and businessmen to calculate everything from job estimating to payroll. Some say that Visi-Calc almost single-handedly legitimized the need for a microcomputer by a small business, and that it led to the early penetration of Apple computers into the small business community.

Versions of Visi-Calc were written for other micros, and many competitors developed more powerful spreadsheet programs. Today there are literally dozens of spreadsheet-type programs (although Visi-Calc is no longer available) for all the popular microcomputers. Some have enormous capacity, and can also utilize 640K or more of RAM (user memory.)

For example, the 6th edition of *IBM PC Expansion and Software Guide* (Que Corporation, P.O. Box 50507, Indianapolis, IN 46250. $29.95) describes 47 spreadsheets for the IBM PC family alone, plus 46 "Spreadsheet auxiliary tools" and 42 "Spreadsheet templates" that provide pre-structured layouts (headings and formula) for specific tasks.

One example of the sophistication available in spreadsheets is "Report Manager 2.0" ($495. Smartware, Inc., 557 Howard St., San Francisco, CA 94105). This is a 3-dimensional spreadsheet with over 16 million possible cells—255 columns x 255 rows x 255 pages—and uses up to 512K of RAM.

Also very popular these days are programs that "pop-up" on the screen to do calculations and other things, such as Sidekick, Spotlight, Cornerman and a host of others. The Que Guide referred to above lists 39 such products under the "Multiple application software" category.

Along Comes IT FIGURES

In the midst of all this competition along comes IT FIGURES, which is neither a spreadsheet or a pop-up calculator, but offers some advantages of both. IT FIGURES is a new concept in easy to learn, simple to use computing power. Entering your formula, data or comment is as easy as typing it on an ENTER line. The calculation result and entry information are neatly displayed on a three-column pre-formatted worksheet.

IT FIGURES will work with all 80-column printers, it's fast in operation, and it comes with over 50 templates. The program is based on the premise that there are thousands of non-accounting applications for the worksheet environment that don't require hundreds of cells for information, or complex command structures for the user to learn.

IT FIGURES allows users to produce worksheets that solve any mathematical problem using a simple three-column, twenty-row design on a single screen. Formulas, variables and constants occupy the first third of the screen width, calculation results show in the second third, and comments are in the last third. Comments may also occupy the first two-thirds of the screen. See Figure 1 for an example of an actual screen.

Using IT FIGURES

The excellent generously-illustrated over-60-page manual describes the many features of IT FIGURES. Complete line and screen editing are supported, together with the use of 10 function keys. IT FIGURES is preprogrammed with all the math and trig functions you're ever likely to use, and you can add your own. Left to right hieracrchy is used in calculations with 22 place accuracy. International symbols are supported, and a Metric Conversion "global file" is included. Free technical support is provided for registered users.

Over 50 templates (preconfigured with formulas and comments) are included on the program disk, as shown in Table I. It's easy to generate and save your own templates, so the program really allows easy customization to your particular needs.

Figure 1 shows the screen display of the Navigator/Beam Aimer template I created to determine the distance and direction between any two points in the Northern Hemisphere. Lines 1-7 describe the purpose of the program, and define the variables to be used. Lines 9-20 provide input, results and comments.

This template is based on my BASIC "Beam Aimer/Navigator Program" published in the July, 1985 issue of *Computer Shopper*, starting on Page 47. I took the essential spherical trigonometry calculations of this program and entered them into IT FIGURES, which supports all the trig functions I needed. Notice the formulas on lines 12-20 of Figure 1.

Also notice that the formulas on lines 14 and 18 end with a right-arrow, indicating there is more to the formula. The formula is truncated (cut off) to leave room for the normal 22-digit accuracy of IT FIGURES. However, the entire formula can be printed on the screen or printer if desired.

By merely entering the

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Table I—IT FIGURES Templates

Business Applications

MARGIN — Profit Margins and Markup Factor
PAYROLL — Payroll work Sheet
BREAKEVEN — Breakeven Analysis
CASHREC — Daily Balance of Cash Drawer
INCOME — Income Statement
BALANCEB — Balance Sheet
ACCOUNTS — Accounts Receivable
ANNUITY1 — Annuities — Present and Future Value
EOQ — Economic Order Quantity
DEPREC — Depreciation using ACRS 3, 5, & 10 Years
WORKCOMP — Workmen's Compensation
QUOTE — Quotation

Home & Business Applications

SIMPLINT — Simple Interest Calculation
STOCK — Stock Return Analysis
INTEREST — Compound and Annuities
STOCKGRO — Value of a Growth Stock
BONDS — Bond Present Value
RULE78 — Rule of 78
INSTALL — Annuity Future Value
MORTGAGE — Monthly Mortgage Payment
SCHEDULE — Schedule for Daily Appointments
COMPDINT — Compound Interest
1040TAX — Income Tax Worksheets (4 screens chained)
INCOMAPR — Income Property Appraisal

Home Applications

MPG — Auto Miles Per Gallon and Cost
HOUSCASH — Monthly Household Cash Flow
CHKBOOK — Check Book Balance
GPA — Grade Point Average
BALANCEP — Personal Balance Sheet
INCOMPRO — Income Property Cash Analysis
COINTOSS — Coin Toss
CREDCARD — Credit Card Balance Check
DICE — Play Dice
MORTBAL — Balance Owed on a Mortgage
MORTPAY — Payments Between Two Periods
BALLOONM — Payment and Balance Due on Ballon Payment
IRA1 — IRA Projection
IRA2 — IRA Investment Analysis
RENTBUY — Rent/Purchase Conversion Analysis
APRLOAN — Adjusted Percentage Rate Loan

Math Applications

TRIANGLE — Pythagorean Triangles
LINEREG — Linear Regression
OHMSLAW — Ohm's Law
BOXES — Squares, Rectangles, Cubes and Boxes
ROUND — Area of a Circle and Volume of a Cylinder
VERTTANK — Vertical Tank Capacity Formula
PERCOMB — Permutations and Combinations
FACTOR — Factorials
RESISTOR — Parallel Resistors and Series Capacitors
NAVIGATE — Shortest Distance Between Two Points
BIKEGEAR — Bicycle Gear Ratios and Shift Sequence

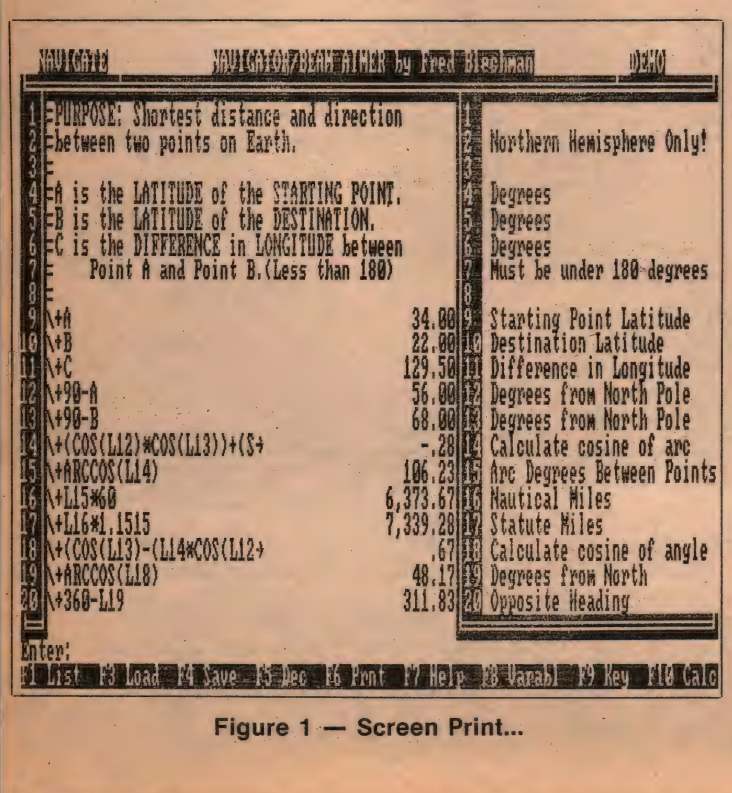

Figure 1 — Screen Print...

Save Sanyo's Screen

by Francis D. Miller

If you often use your Sanyo BASIC, as I do, you'll appreciate this little program. Actually, it's a pair of machine code subroutines that you poke into memory, then CALL from BASIC. When you want to preserve the screen, you call the first routine from your BASIC program. And the entire screen, nearly 16k bytes, is loaded onto disk in one swoop. Then, if you call the second routine, the original screen appears again. That's all it does.

By itself, this isn't much of a program. You'd soon get tired of saving the screen and watching it reappear. But I've written it to be merely the basis, the jumping off point, for other programs. Let me give you an example. Say you've written a program to draw pictures, or designs, in Sanyo BASIC. With these subroutines, you can save each screen as you work. Later you can recall the designs, making changes or simply admiring them again. And because it's machine code, it's fast. If you have a RAMDISK, you'll be able to flip through the screens with lightning speed. Well, pretty speedily, anyhow.

But, first, a word about the Sanyo 55X's color. Your Sanyo machine stores its video data in three locations: one in dynamic RAM (which will be 1C000, 2C000, or 3C000, depending on the amount of memory you have), and two in static RAM (F0000 and F4000). Those last two are for the red and blue colors. We don't need them if we use a monochrome monitor. And I don't save them in my screen dump program. If I did, we'd need 48k of disk space for each screen, rather than 16k. That's why this program only captures the monochrome screen. If you

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Spotlight On Business

Spotlight on Medical Resources
Part III

PBAR (PATIENT AND BILLING ACCOUNTS RECEIVABLE)

FAR WEST SYSTEMS

PBAR is a complete accounts receivable and billing system including the preparation of insurance claims forms and management reports. PBAR provides: Customized input forms especially designed for entering patient data and charge transactions, automatic pricing by RVS code, daily and monthly reporting for complete audit trail, ease of locating patient transactions and current balance and for analysis of accounts receivable, complete billing service with two parts, aged statement in superbill format, preparation of standard insurance forms and Optional practice analysis provides a monthly summarization of the practice. Other PBAR features include: on-line patient registration, patient appointment scheduling, doctors appointment and hospital logs, automatic printing of charge slips, time of service front desk billing, instant financial and history inquiry, patient demographic data base, patient transaction history, ledger card print or display, rolodex cards chart or mailing labels, patient insurance claim history, research and analysis subsystem, CRT inquiry via a name or number, financial display with last statement data, history transaction display of all data by date, open insurance claim inquiry by patient, notes on history file for unusual situations, complete ledger history printed on ledger card, automatic billing of primary/secondary insurance, automatic conversion of your code to insurance codes, open item control of assigned insurance, separate aged receivable by insurance carrier, separate Workers Compensation daily invoice form, Workers Compensation follow-up statements, patient and insurance aged receivables, delinquent account reports and notices, dunning and collection reports and notices, daily practice charge and payment reports, monthly service and referral analysis and automatic allocation of practice collections.

OMECOM

FAR WEST SYSTEMS

A professional eyecare computer system. The OMECOM patient management system provides the eyecare professional with a complete patient billing, third party insurance, prescription history, lens and frame ordering, inventory control and service agreement for contact lenses. Patient appointment scheduling provides fee ticket preparation as well as visual appointment book and calendar. Practice building is a key benefit of the OMECOM system, utilizing a multiple key selection from the patient data base for recalls, birthday cards and lists with specific information from the prescription history. Contact lens agreements are easily managed by the system. the practice may select all patients that have agreements expiring on future dates and the system will automatically sort the patients due for renewal. Patient letters for initial visits and referrals are easily done with the integrated word processing features.

MEDI/CLAIMS

WOOLF SOFTWARE SYSTEMS

Complete medical claims transmission. Electronically transmit medicare claims. Customize to fit your practice. Transmissions are all automatically error-corrected. You are given the option to enter and modify whatever procedure and diagnostic codes are needed for your specific application. Display all unprocessed claims. Change and reverse status of claims. Automatically add in costs for any D.M.E. expenses. Build claims transmission files. Transmit claims to Transamerica. Print out all claims for your files. Move all completed claims to back-up disk.

MEDICAL OFFICE SYSTEM -2 VER-1.1

WINDHAM SOFTWARE INC

This program is a complete medical office system capable of maintaining records for 10 doctors at a time. The medical office system manages records for 15,000 patients with patient recall by procedure, stores 15,000 transactions, performs accounts receivable, maintains billing aged up to 120 days, generates insurance forms and allows for 500 medical procedures and diagnostics.

PULMONARY FUNCTION SYSTEM VER. 1.2

VACUMETRICS INC.

This program uses the Apple or IBM personal computers to gather and process patient data from a variety of spirometers. Calculations of tests for this program include normal spirometry results. Software options include MVV, patient files and measurement of lung volumes.

OBUS OBSTETRICAL ULTRASOUND SYSTEM

TRINITY COMPUTING SYSTEMS INC.

Facilitates the conduct, evaluation, and reporting of obstetrical ultrasound examinations. OBUS was designed to facilitate obstetrical ultrasound examination. A graphics tablet is used to enter information on fetal survey, presentation, and placental and amniotic fluid characteristics. Quantitative parameters are then measured by the microcomputer, after which the physician enters his or her interpretations of ultrasound findings on the graphics tablet, and a report is generated. OBUS provides enhanced fetal evaluation, speeds up the interpretation and reporting process, and reduces transcription needs. It is an ideal tool for research and teaching.

INTENSIVE CARE SUPPORT SYSTEM

TRINITY COMPUTING SYSTEMS INC

This program aids physicians and staff in caring for patients in critical care units. This system is designed to help maximize the care given in critical care settings. The system assists in data storage, analysis of patient data, and trend identification. Full text and graphical reports are printed which can be included in the patient's chart. Reports can be obtained on a patient's cardiovascular, respiratory,renal, fulid balance, or overall status. Important hemodynamic parameters can be tracked graphically for trend identification. One system can support multiple patients.

ECHOCARDIOGRAPHY SUPPORT SYSTEM

TRINITY COMPUTING SYSTEMS INC.

Aids in the rapid measurement, analysis, and reporting of M-mode and 2-D echocardiogram data. An ideal research tool. The physician or technician conducting the echocardiogram uses a digitizing tablet and magnetic pen to enter up to 66 separate pairs of measurement points into the computer, which then calculates all distances. The automatic mode allows each item to be measured in succession without the need for individual selection: the manual mode allows selection of each measurement in any order. The physician may choose to modify the program, edit data, and modify patient reports with the interactive features of the program.

CATH LAB SUPPORT SYSTEM

TRINITY COMPUTING SYSTEMS INC.

Medical analysis, patient reporting, quality assurance, and administrative help for the cath lab. The Medical Analysis and Patient Reporting Module enables the physician to quantitatively analyze a patient's catheterization report, and receive an accurate, typewritten report minutes later. A graphics tablet is used to enter information from the patient's film, and may also be used to analyze pressure traces. The computer then calculates ventriculography results, including ejection fraction, LV mass, and wall motion, and the physician may select from list of 100 comments to add to the report. Calculation for congenital/pediatric catheterizations are also included. ●

Spotlight on Medical Resources Table II

(Continued from last month)

139. Q-PRO 4 in Medicine: Q-PRO 4 Tracks Medical Data for Artificial Heart Patients at the Humana Heart Institute.
Puckett, G.
Computer Consulting, Louisville, KY
Data Based Advisor Vol.3, No.9, Sept. 1985, P. 54-55.

140. Quanitative Analysis for Ultrasound Imaging.
Kinicki, R.M.
Hewlett Packard Co., Palo Alto, CA
Hewlett-Packard Journal Vol.34, No.10, Oct. 1983, P. 8-9.

141. Question Databases Speed Up Creation of Numerous Tests.
Jones, P.
THE Journal Vol.12, No.5, Jan. 1985, P. 90-91.

142. Raking In the Microchips.
Dudley, A.
Medicine & Computer Vol.1, No.2, Jan. 1984, P. 36-39. 3 Pages.

143. Record Management System: Honeywell Medical.
Anon
Computers in Healthcare Vol.5, No.11, Nov. 1984, P. 69.

144. Reduction of Physiological Signal Contamination Using Linear Filter Identification.
Weiss, P.L.; Hunter, I.W.; Kearney, R.E.
McGill University, Montreal M3G1Y6, Canada
Medical & Biological Engineering & Computing Vol.21, No.4, July 1983, P. 521-524. 4 Pages.

145. Researchers Draw Roadmap of Heart.
Anon
Mini-Micro Software Vol.10, No.2, 1985, P. 6-7.

146. Review of Microcomputer Nutrient Analysis and Menu Planning Programs.

continued on page 90

Table III

Abstracts of Selected Bibliographic References (Culled From Various DIALOG Databases)

A Compendium of Medical Software for Microcomputers
Polacsek, R.A.
Johns Hopkins University, Baltimore, MD, 21205
M.D. Computing Vol.1, No.6, 1984, P. 28-55. 27 Pages.

A survey of medical software products was done of software vendors. The information is strictly that which the vendor provided. No testing was done. Seventy-nine products are reviewed. Indexes are provided. Products are indexed by operating system, by state and zip code, by language, and by hardware facilities. The information on each product includes company, contact person, years installed, number installed, computers supported, operating system, language, printer, number of users, software cost, hardware/software, service contract, source code cost, installation cost and features.

A Computer Program for Detection of Segmental Contraction Abnormalities By the Left Ventricular Cineangiogram.
Nose, Y.; Watanabe, Y.; Yokota, M.; Nakamura, M.
Computer Programs in *Biomedicine* Vol.17, No. 1/2, Aug./Oct. 1983, P. 101-106. 5 Pages.

A computer program, written in FORTRAN, is described, which provides for interpretation of left ventricular wall contractions. The identification of contraction abnormalities is utilized in diagnosis of patients with ischemic heart diseases. This method is based on superimposing ED and ES silhouettes traced from cineangiograms and has been in clinical use since 1979.

A Computer Program Using a Nested Analysis of Variance in Morphometric Sampling.
Kornegay, W.D.III; Poole, M.C.
School of Medicine, East Carolina Univ., Greenville, NC 27834
Computer Programs in *Biomedicine* Vol.16, No.3, June, 1983, P. 155-160. 5 Pages.

A nested analysis of variance has been written for laboratory microcomputers to provide rapid feedback on the analysis of morphometric samples. Certain levels of sampling can then be increased to reduce the variance within the sample set. The ANOVA is for two levels of unequal sample sets. A flow chart of the program is shown. An output from a sample run of actual data is provided. A listing of the program can be obtained from the authors.

A Directory of Medical Software Companies.
Polacsek, R. A.
M.D. Computing Vol.2, No.4, July-Aug. 1985, P. 47-53. 7 Pages.

There are many software packages available for the medical profession. Most of the software runs on off-the-shelf microcomputers upgraded to small minicomputers. A directory of medical software vendors is divided by General Office Practice Programs and Programs for Clinical and Other Medical Purposes. A subject index is included.

A Dose of Micro-to-Mainframe Medicine.
Inglesby, T.
Micro Communications March 1984, P. 31.

Eli Lilly and Company selected the Softerm 100 terminal emulation package from Persoft, Inc. of Madison, Wisconsin. The software-only product costs less than the Irma board and works both in IBM and DEC environments. It requires an IBM PC, an 80-column monitor, 96K of memory, an asynchronous I/O board, PC-DOS and an RS-232 connection. The baud rate is 9600. Softerm 100 has several features that DEC's VT100 does not have. It supports four unique setup configuration and provides softkey support.

A Drill and Practice Program for Online Retrieval.
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Drill and Practice Program for Online Retrieval (DAPPOR) is a series of computer programs and a data base to aid students in learning to use four major data bases. The data bases include BRS, the National Library of Medicine's Elhill System, Lockheed's Dialog, and System Development's Orbit System. DAPPOR was developed to help students use online retrieval systems to supplement classroom work. DAPPOR teaches the command protocols of the four data bases. A table of DAPPOR questions and screen dis-

continued on page 182

Table II
continued from page 89

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MISCELLANEOUS

The New CD-I Mass Storage Technique

by Les Solomon

The laser-read CD Digital Audio disc has been accepted as the world standard for "state of the art" high-fidelity audio recording and playback.

Historically, the Compact Disc was developed by Philips (Holland) in 1978 and could store about one hour of high-fidelity recording on a 5" diameter disc. Sony (Japan) came into the picture to cooperate with Philips to establish the new media as a world audio standard.

It did not take long for the computer industry to latch onto this new form of very dense mass storage. Unfortunately, at the moment, this technique is essentially write-once-read-forever. The computer industry called their approach CD-ROM for Compact Disc—Read Only Memory.

The CD-ROM handles both text and data using the 8-to-14 modulation and CIRC error correction identical to that used in CD Digital Audio approach. But in each frame, provisions are made for error detection and error correction (ECC/EDC). Storage capacity of a CD-ROM is about 600 Mbytes. Now, a new generation of Compact Disc recording, called CD-I (Compact Disk—Interactive) is about to make its presence felt. The specifications for his new disc define a media that is driven mainly by digital and analog video and digital audio information, linked to text, data, and computer programs.

The new CD-I players are completely compatible with all current CD Digital Audio discs and the standardized format assures that any disc can be used with any player.

CD-I is a logical extension of the CD-ROM and is specifically oriented towards consumer and institutional applications. However, CD-I not only handles the computer data storage of a CD-ROM, it also provides storage for large amounts of audio and video information.

Each CD-I disc can store over 650 million characters of data which translates into 150,000 printed pages of text, or up to 20 hours of speech quality sound. However, it should be pointed out that CD-I will not make the CD-ROM obsolete as a computer peripheral.

The interactive aspect of this new technique allows the user to rapidly locate different pieces of data information located anywhere on the disc, and convert them into a single composite data stream for output.

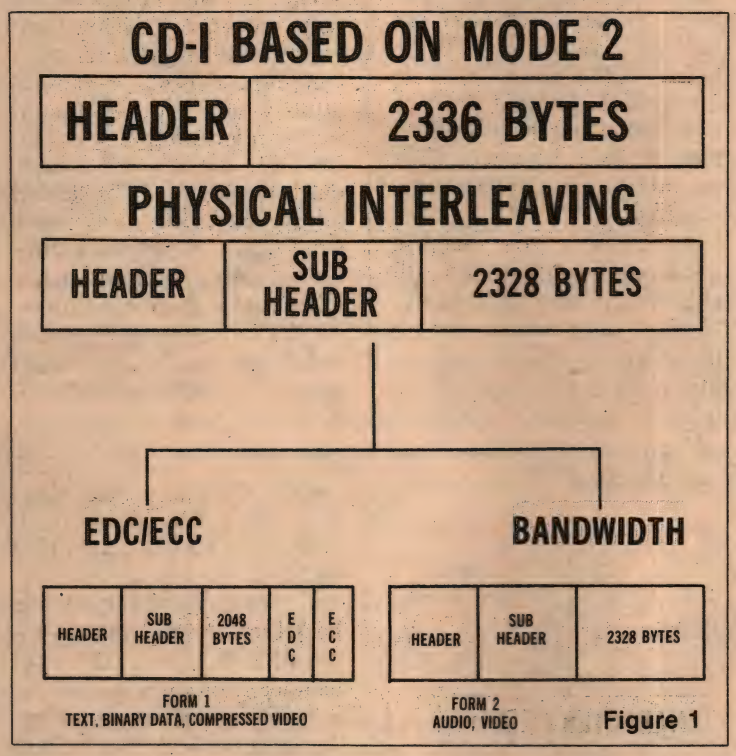

Figure 1

Some CD-I Applications
Table I

In the car:
- maps
- navigation
- tourist information
- real-time animation
- diagnostics

Education and Training
- do-it-yourself guides
- home learning
- interactive training
- reference books
- albums
- talking books

Entertainment
- music "plus"—music with text, notes, pictures, etc.
- action games
- strategic games
- adventure games
- activity simulation

Creative Leisure
- drawing/painting
- filming
- composing

Work at Home/While Traveling
- document processing
- information retreival and analysis

This opens up many new areas for CD such as talking encyclopedias, dictionaries, textbooks, electronic magazines and catalogs. It also permits "music plus" style presentations, and a new breed of almost life-like computer games. Table I shows some uses, although far from complete. Essentially, uses for the CD-I system are similar to where the microcomputer was back in 1978. The boom has not yet started.

CD-I systems are based on the 68000 microprocessor family plus some special LSI chips developed by Philips and Sony. Operating software is based on the Microware OS-9/68000 operating system plus a special CD-I file manager. OS-9 is a modular, real-time/multitasking operating system that is compact, ROMable, and provides a Unix-style environment for application software.

The Microware-developed software fully supports multiple audio and video formats including mixed data types within a single file.

Video display capabilities include conventional TV resolution and bit-plane graphics (RGB plus a color lookup table) in both normal (384 x 280 pixels) and high-resolution (768 x 560 pixels) modes. The latter mode will be achieved by the upcoming enhanced or digital TV.

To allow users to optimize storage requirements and playing time, besides the video selections, four selectable digital audio qualities allow four audio outputs equivalent to LP record quality, FM radio quality, AM radio quality, and a somewhat better than telephone quality.

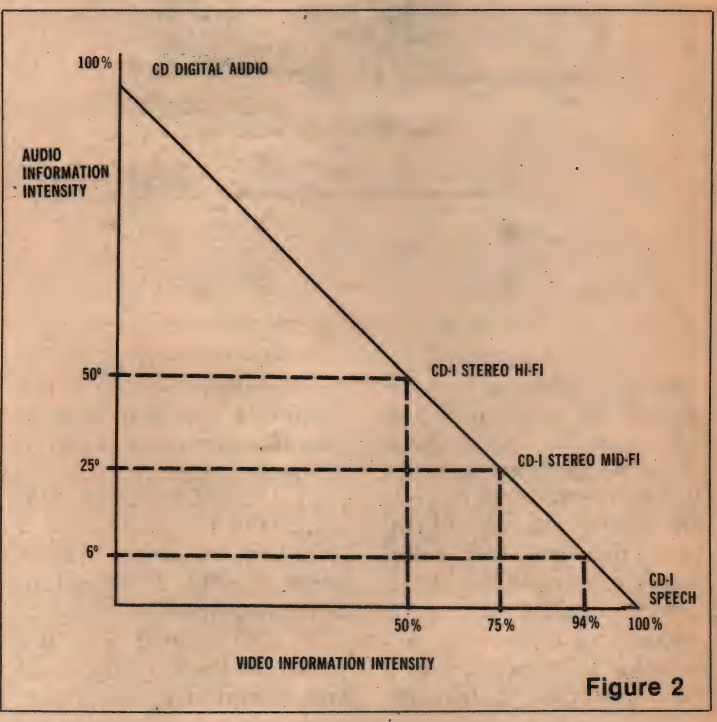

Figure 2

Video refresh time and full-screen animation imply the use of video compression techniques, thus it seems that CD-I will be primarily an audio/video medium.

Data processed by the CD-I system falls into two different forms—one that can tolerate some degradation such as audio and certain types of conventional video: and the other such as text, binary data, and compressed video binary information that is either there or not there.

In the former case, maximum bandwidth is the main requirement, while in the latter case, some form or error detection and correction (ECC/EDC) formats for the CD-I use these two forms as shown in Figure 1—Form 1 is with ECC/EDC and Form 2 is without ECC/EDC.

Audio

Audio data coding for the CD-I uses 4- or 8-bit adaptive delta pulse code modulation as opposed to the 16-bit PCM (pulse code modulation) used in the CD Digital Audio System.

continued on page 92

AUDIO CODING	STEREO/ MONO	# CHANNELS	
CD-DIGITAL AUDIO	STEREO	1	16-BIT PCM
HI-FI MUSIC AD PCM	STEREO MONO	2 4	LP MUSIC QUALITY
MID-FI MUSIC AD PCM	STEREO MONO	4 8	FM BROADCAST QUALITY
SPEECH AD PCM	STEREO MONO	8 16	AM BROADCAST QUALTIY

NOTE: ADPCM IS ADAPTIVE DELTA PULSE CODE MODULATION.

Figure 3

Tests Confirm Protection Against VDT Radiation

VDT Radiation Screen

In tests completed here this month, the performance of VDT radiation products—a grounding glare screen and a lab-style apron—both recently introduced by Mitsubishi Plastics Industries, Ltd., one of Japan's most reputable firms, have been validated.

Because of its interest in products for VDT protection, a small west coast distributor, Noetic Systems of Los Altos, California, sought to validate the radiation shielding claims of the manufacturer.

"To our knowledge this marks the first time such a giant firm has addressed these needs," said Don Allen, general partner of Noetic. "The Mitsubishi Plastics' products—the Softwave screen and Compron apron—incorporate some new technology claiming some rather spectacular shielding properties. The fact that a firm of their reputation was marketing such products created interest, but we wanted to validate the protection claims for our own peace-of-mind. When you are talking about reducing hazards, you have to be sure."

Noetic located EMCE Engineering, Inc., of Fremont, California, an FCC-approved laboratory, to conduct the test.

"EMCE is a specialist in the FCC type of radiation testing and the results were truly amazing," said Allen. "Here was what looked like an ordinary glare screen that you could see through and what appeared to be a kitchen or lab apron. When properly used, both products blocked the various radiations—from below faster scan rates to microwave frequencies—by anywhere from 90% to better than 99.99%," he said. "The manufacturer's numbers were confirmed."

Allen stated that the test results were being made available to any interested party. "For products like these, it's important to be extra responsible and obtain verification from an independent authority, not unlike a mini consumer testing organization," he said.

Allen noted that the controversy over potential VDT health hazards continues. In recent weeks a panel of scientists meeting in Geneva, pronounced VDTs safe. But simultaneously, the Swedish government, based on research with birth deformities in laboratory animals exposed to pulsed VDT electromagnetic fields, established tight VDT radiation standards.

"In our view the scientific verdict is not yet in," said Allen. "Long term scientifically valid research needs to be done."

For additional information contact Noetic Systems, 900 N. San Antonio Road, Los Altos, CA 94022. ●

Palantir Software MS-DOS Or CP/M?

Palantir Software has announced its intent to continue marketing and supporting its CP/M products, though the demand has been for MS-DOS versions of software. Palantir Software is one of the few companies still supporting those running under the CP/M operating system. In the IBM dominated microcomputer world, MS-DOS has become a standard, leaving many frustrated CP/M users left to wander from dealer to software publisher looking for high quality software for their computers.

"We still continue to receive orders for the Palantir Word processor, Speller and Filer on Apple II with CP/M card, Kaypro II-2-2x-4-10, Televideo 802/803, and Standard 8 inch," stated Michael Wideman, who is in charge of production and support for Palantir Software. "We have a continuing commitment to provide product for the large public base that has already purchased CP/M," he added.

CP/M products available from Palantir Software include the Palantir Word Processor, the Palantir Speller, and the Palantir Filer.

For additional information contact Palantir Software, 12777 Jones Road, Suite 100, Houston, Texas at (713) 955-8880. ●

CD-I Mass
continued from page 91

Since at the most, 50% of the time can be allocated to stereo sound (see Figure 2), a lower data rate (8 bit instead of 16 bit) with a lower sampling rate and a different coding technique must be used.

Four basic types of sound quality are defined in the CD-I specification and these are shown in Figure 3.

Note that a channel shown in Figure 3 is equivalent to a maximum of 72 minutes continuous playing time. This means that the 16 "hours" are composed of 16 parallel channels of 72 minutes each, with a 1- to 3-second gap before the next continuous "hour" can be listened to.

Video

CD-I specifications make a distinction between video resolution and coding, and take into account both present and future TV standards. These include present day TV techniques using 384 x 280 pixels, and the high-resolution of 768 x 560 pixels used by high-resolution color video monitors and future digital-TV receivers. The CD-I approach can be used on any type of TV system including NTSC, PAL, or Secam.

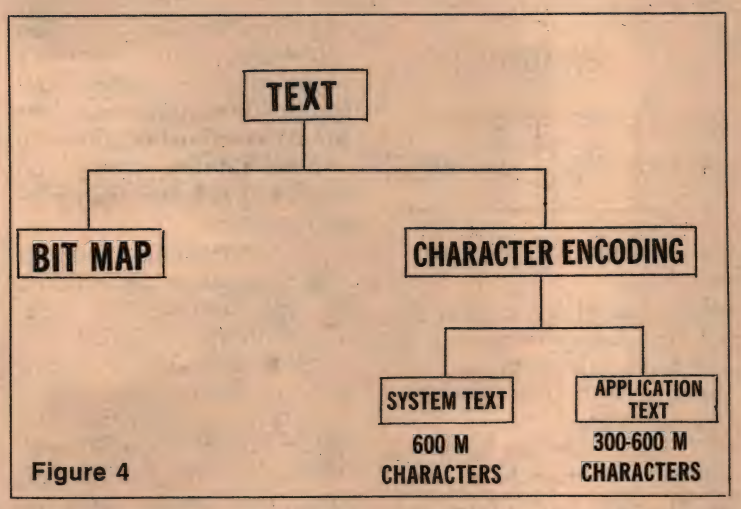

Figure 4

Provisions are made for three picture qualities—those equivalent to the best TV monitor quality, and two graphics levels.

In the TV mode, each picture occupies about 305 kB per picture without interlacing and 650 kB with interlacing. To decrease throughout times, this mode can be compressed to 108kB.

The first graphics mode is based on absolute RGB coding and allows 256 colors out of some 32,768 colors. In this mode, a 15-bit RGB picture can be stored in 215 kB, or an 8-bit RGB image can be stored in 108 kB. No compression is used in this mode as this approach is designed for use with creative leisure applications in which the user may wish to manipulate the original image.

The second graphics mode uses color look-up tables that allow 16, 128, or 256 colors. In this mode, the user can select 8 bits out of 24 bits for 256 colors out of 16 million and requires 108 kB of storage capacity per image. With compression, storage can be reduced to 10 kB per image. When the latter is combined with interleaved audio, this can produce full-screen animation.

Text can use either a bit-map process with data compression, or character encoding via systems or applications software. This is shown in Figure 4.

The bit-map approach requires some 5 bytes per character resulting in a maximum of some 120 million characters per disc (if only 16 colors are used in an 8 x 10 matrix). However, these characters cannot be further manipulated under program control.

Character-encoded texts can be either system text or application text using 1-byte per character, producing some 600 million characters on a disc. Application text can be encoded on an extended basis using 2 bytes per character. The second byte specifies factors like color, font, size, etc. This results in 300 million characters per disc. In these latter two cases, it is possible to futher manipulate the text via software, for example; to incorporate text fragments from the disc into a report being written by the consumer.

Since conventional TV receivers are bandwidth limited, text to be displayed on these devices should be limited to 40 characters on 20 lines. The high-resolution mode allows 80 characters by 40 lines to be displayed on a suitably wide bandwidth video monitor.

Disc Layout

A disc can use the CD-I logo if there is at least one CD-I track on the disc. If CD Digital Audio tracks are also present on the CD-I disc, then the first CD-I track will contain only essential information such as the Table of Contents, and possible the bootstrap and file directories. This information is muted if a CD-I disc is used in a CD Digital Audio player.

If CD Digital Audio tracks are present on the CD-I disc, they will be located after the first CD-I track. Any other CD-I information is contained after the CD Digital Audio tracks.

The Table of Contents contains information about the disc type and format, as well as identifying the disc alone or as a member of an album. In addition, the Table of Contents carries information covering disc size and the position of the file directory and bootstrap required to start up the CD-I player. The hierarchical file structure allows opening files in a single seek operation.

Since a CD-I disc can carry video, audio, or computer data, and these can be intermingled, some form of synchronization is necessary to ensure that the correct data is supplied at the correct time.

This is not as simple a matter as that used in film or video cassettes where the video and its sound are recorded simultaneously (usually side by side with a constant distance between the two tracks).

The information for the CD-I must be extracted from different places on the disc and processed into single data stream. To handle the various timing chores, CD-I uses a physical interleaving recording process that is combined with data-driven interrupts. ●

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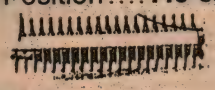

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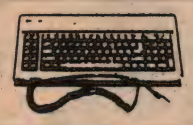

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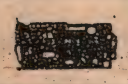

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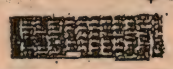

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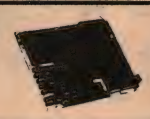

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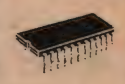

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74LS1XX	.33	74ALS1XX	.39
74LS2XX	.44	74ALS2XX	.40
74LS3XX	.49	74ALS3XX	.59
74FXX	.29	74HCXX	.37
74F1XX	.39	74HC1XX	.49
74F2XX	.55	74HC2XX	.59
74F3XX	.59	74HC3XX	.69
74HCTXX	.33	74SCXX	.33
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16K - Dynamic — 150ns	.45	16K - Static — 300ns	.95
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*256K - Dynamic — 150ns	3.35	2114 Type - Static	.55

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8039	2.45	8205	2.50	8257	1.75
INS8060	9.95	8212	.90	* 8259	1.75
INS8073	9.95	8214	.95	8271	39.95
8080A	.70	8216	.90	8272	3.95
8085	3.95	8224	1.90	8274	8.95
8085A-2	9.95	8226	1.90	8275	8.95
8086	4.50	8228	2.20	8279	2.50
8086-2	5.20	* 8237	2.90	8282	2.95
8087-3	129.95	8238	2.35	8283	5.95
8087-2	169.95	8243	1.25	* 8284	2.45
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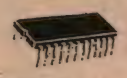

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3.000	1.15	12.000	2.00
3.120	1.20	13.440	1.00
3.2	1.49	14.31818	1.00
3.4560	1.49	15.2	1.10
3.579545	.60	16.00000	1.50
3.6864	1.10	16.5888	1.49
4.000	1.75	17.430	2.49
4.194304	1.50	18.000	1.49
4.433618	.75	18.2259	1.00
4444.000	1.25	18.4320	1.49
4.9152	2.49	18.432OSC	2.95
4.916	1.25	20.000	1.29
5.000000	1.50	21.87108	1.00
5.0688	1.70	32.000	2.49
5.616	1.59	40.000	2.00
6.000	1.00	87.3333	1.00
6.176	1.49	91.000	1.00
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CRT CONROLLERS

5027	6.95
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68B45-(HD46505SP)	8.00
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78M05T - 500 MA	.22
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10/$10.50 or 20/$17.50

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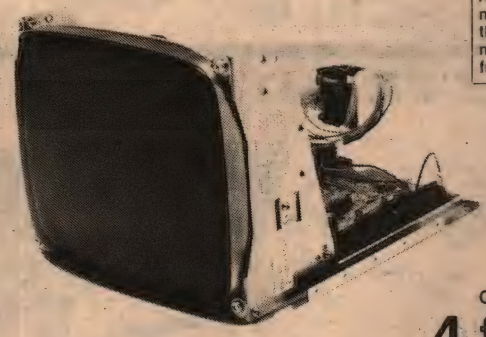

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"TALKERS"

SPEECH SYNTHESIS TECHNOLOGY AT SURPLUS PRICES!

We were recently fortunate to purchase a small lot of surplus computer boards that incorporate the very latest in high quality human speech synthesis.

This two board set was the heart of a blood analysis system designed for use by blind diabetics. This unique device was conceived by one of the world's leaders in computer blood systems. Apparently no expense was spared in either the research, design, or fabrication of this computer.

The board sets we are offering are NOT complete blood analysis systems and are sold only for the speech synthesis circuitry they contain. A powerful motorola 68705 U3L single chip processor controlled the blood analysis unit. This processor also interfaces to the General Instruments two chip speech set which includes a SPO256-AL2 (28 pins) and a SPROOO (40 pins).

The GI SPO256 contains 59 addressable allophones and 5 pauses which may be strung together to produce any English word. The SPROOO allows expansion to the external EPROM (27128) for storage of the desired vocabulary. The SPO256 also has a vocal tract model, 16K ROM, ALU, handshake control, pulse width modulator, 12 holding registers, and 5 interpolation registers all in one 28 pin package! This high density chip design allows for a complete voice system that requires only a few parts to be complete.

By adding only one resistor, the units can be put into a "Test" mode to demonstrate the internal vocabulary. This board set has been selling like crazy at surplus stores in both Dallas and Houston. We have, however, set aside a limited number of these boards for sale to our special mail order customers. One resourceful customer in Houston even had one of these "Talkers" connected to his personal computer doing random speech!

These devices were powered by a regulated 9VDC 1 Amp power supply. We have luckily acquired a FEW of the supplies, and are selling them for $6.95 each when purchased WITH the Talkers. The DC supply is a totally self contained affair that is rated for only 10 mv ripple at the output. DC supply when purchased separately is $12.95.

We are also offering the GI set separately (new, unused parts) for $9.95. Remember: this is for BOTH chips. Radio Shack sells the SPO256 alone for $12.95!! Our stock on the new chip pairs is limited, please order early to avoid being left out. Sure, the completed Talker units are a better deal, but you still might want to purchase an extra chip set for a spare.

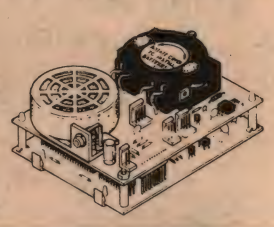
For the real hardware hackers we have a few of the blank PC board sets to the Talkers for $4 (both boards).

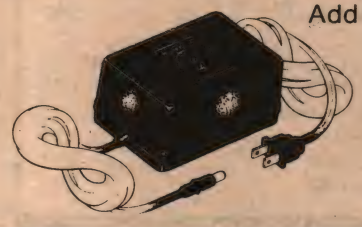
We include full schematics of the Talkers, GI speech chip set data, and "Test" instructions, with every shipment. Note: issue #29 of Analog Computing (P.O. Box 615 Holmes, PA 19043) has a very detailed article on using the SPO256 with a personal computer.

Due to the limited number of Talkers in stock, we advise early ordering.

Radio Shack tm of Tandy Corp.

3.12 Crystal **$1.20**
Chip Set **$9.95**
P.C. Board Set **$4.00**
Power Supply Alone **$12.95**





Add $3 Shipping in USA, Canada: add $6
(For Talker and supply)

Talker **$14.95**
Power Supply **$6.95**
(When Ordered With Talker)

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Kit includes keyboard, plastic housing, with built-in palm rest.
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Assembles in only 3 minutes.
Has same make and break codes as standard PC, XT keyboard.
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This high quality American manufactured keyboard with custom designed housing originally cost a large OEM over $100.00 each in very large quantities.
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$39.95 Each *or* 3/$99.95
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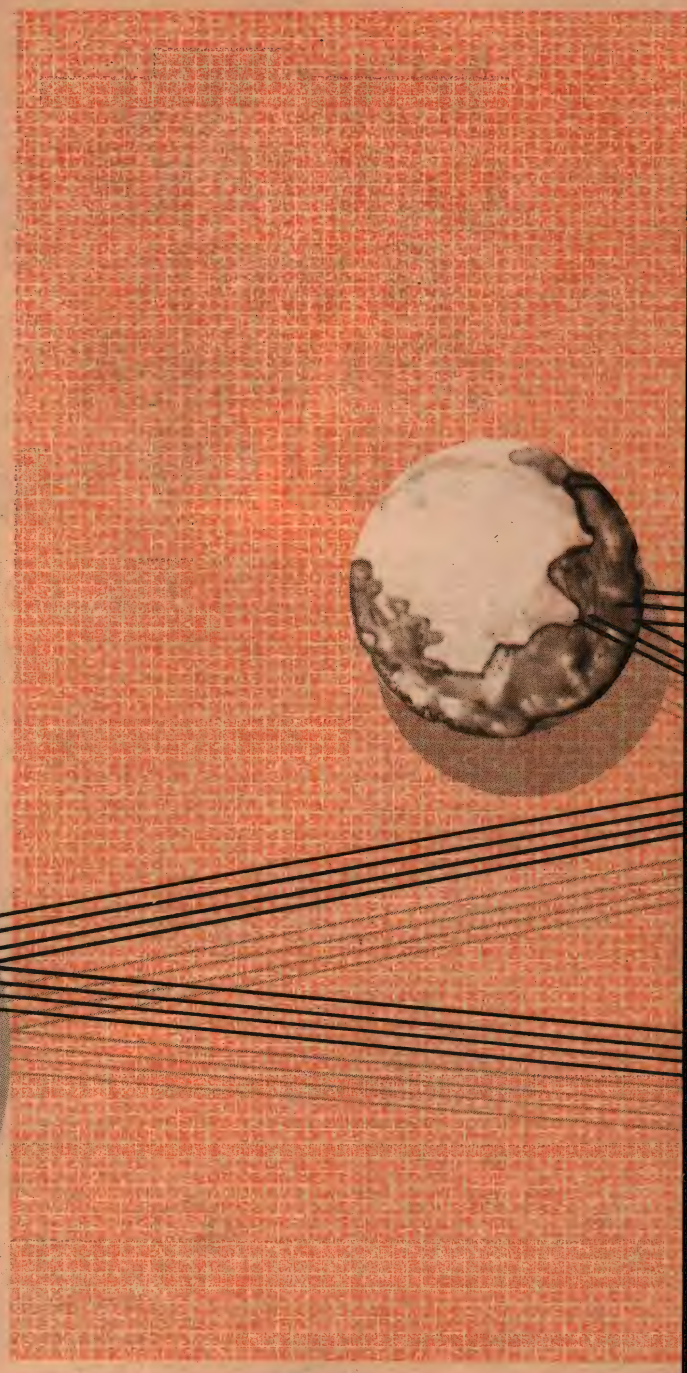

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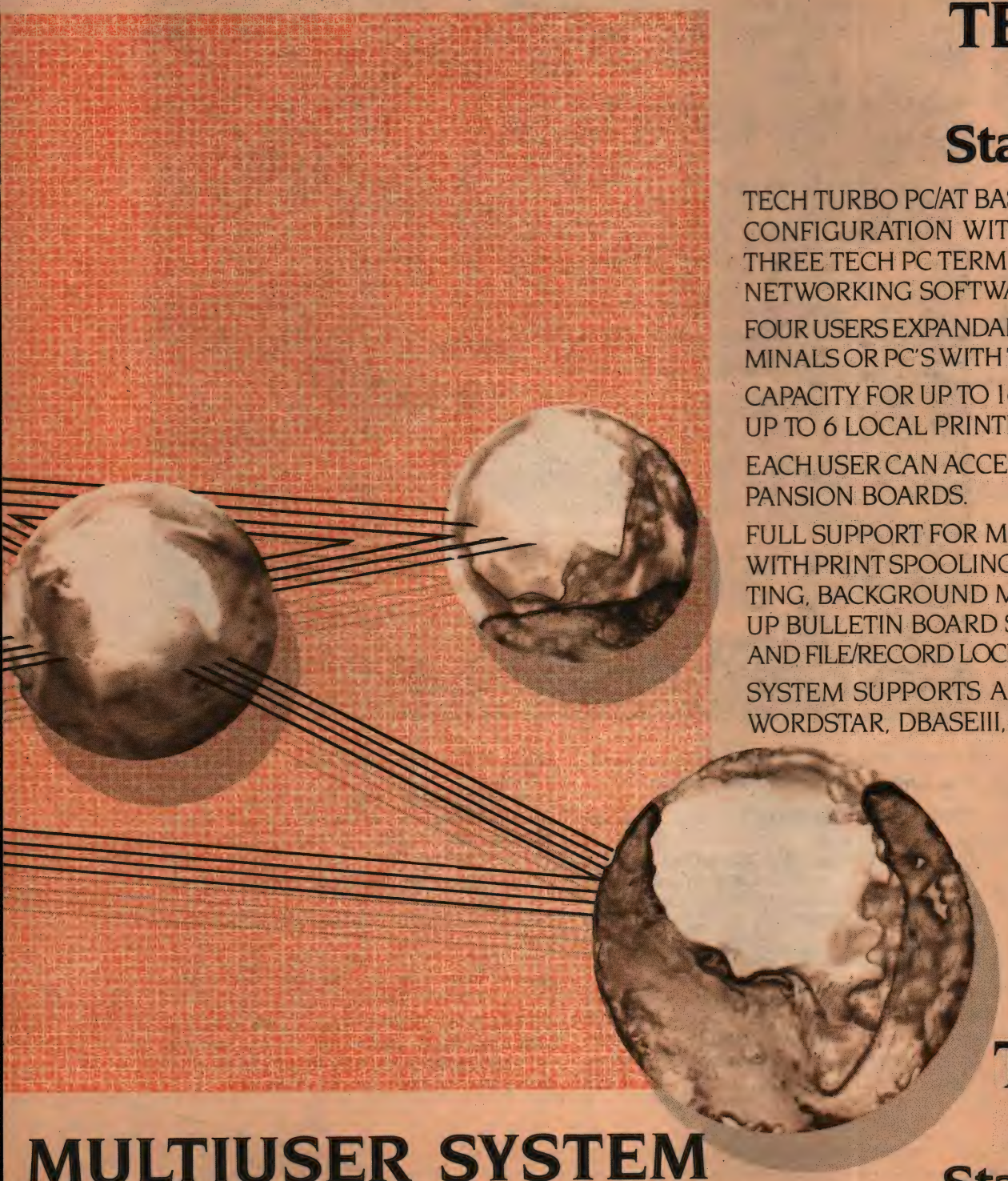

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SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.

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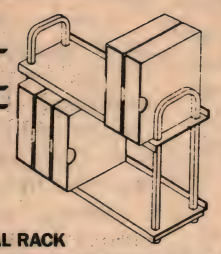

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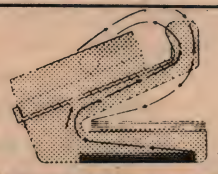

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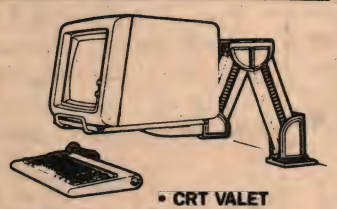

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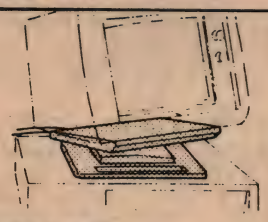

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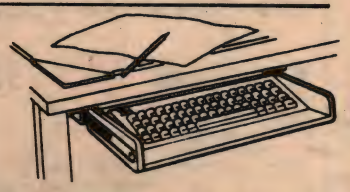

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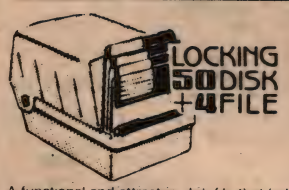

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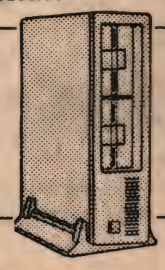

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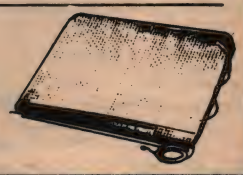

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Writing With Use of Textbases

by Hal Nieburg

If you are an author, scholar, report writer, student, or busy executive, you can use this system for original composition. This system is for use with any good word processor. No other software (other than standard DOS utilities) is required.

It enables the writer to mobilize the computer for every step in the process of creative writing. It provides a simple and rapid process for collecting, organizing, collating, and retrieving all kinds of note materials, including bits and fragments of ideas, commentaries and imperfect notions, word lists, extracts and excerpts from published sources, all kinds of research notes as well as tentative working outlines (without the use of additional ThinkTank/Ready outline software). And it provides a method for facilitating the act of composition by using in a natural and powerful way many of the capabilities of microprocessor and software.

Inadequacy Of Databases

Automatic spreadsheets were a quantum leap ahead and changed the nature of every kind of bookkeeping, creating a multi-dimensional tool of unlimited scope and power for dealing with tables of numbers. So in the same wise we are now glimpsing the start of important breakthroughs in getting words on paper.

Ordinary database programs are not very useful for files of text notes, especially those composed of long excerpts from printed works, or composed of text fragments originated by the author. Yet such a textbase is exactly what is needed by a large portion of computer users, especially writers, scholars, and students.

The typical database permits thousands of records in the nature of filecards, like mailing lists, billing accounts, catalogs of books, what have you. This is a wonderful facility, because it allows the user to access very large sets of information for a variety of purposes: to find, sort, array and/or printout all items meeting certain descriptions; to organize the entire data-collection in accordance with one or another of its fields; to search the contents, locate, and make quickly accessible keywords or other attributes which may be present in the files; and to construct simple or multiple indices and cross-indices of the material.

These are the right functions, and are generally not capable of handling extended text files. Card file type databases drastically limit the size of each record to at most a page or two of material. The only way to store extended text files with a conventional database program is to break them into small excerpts, enter one per card, with uniform reference fields. This is workable, in fact it is not unlike traditional methods by which writers work. But it uses only a fraction of the computer's power and is woefully inadequate when compared with what is possible.

Furthermore, existing data management software has on-

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Modula-2
continued from page 68

cess and its workspace at a given location. START-PROCESS initiates the execution of a given process. Interprocess communication is accomplished via a signal, a shared memory area, and the procedures SEND and WAIT. For instance, lets say we have two processes, Fetch and Deposit. Deposit's job is to fill a common buffer with data and Fetch's job is to retrieve this data after the buffer is full. We must make sure, though, that the buffer is full before Fetch tries to retrive its data. Also, a check must be made to see if the buffer is empty before Deposit fills the buffer with data. Via a signal, and the SEND and WAIT procedures, we can synchronize the processes, Fetch and Deposit. Let us assume that the buffer will initially be empty. We can start the Deposit-Fetch sequence by sending a signal to deposit to start its execution. This is done by a call to the SEND procedure. When Deposit finishes filling the buffer, it suspends its activity and sends a signal to Fetch to empty the buffer. And again, when Fetch clears the buffer, it sends a signal to Deposit to refill the buffer. A process suspends its execution via the WAIT procedure. In other words, the process waits for another process to send it a start signal.

Conclusion

Modula-2 lends itself to be a constructive tool in systems design and programming. The module concept allows large complex systems to be broken down into several small fragments. Each fragment can then be designed without consideration for the method of implementation of the other modules. Since Modula-2 incorporates low-level facilities, it becomes the best alternative to assembly language for systems design. If you are interested in learning more about Modula-2, the book entitled *Programming In Modula-2* by Niklaus Wirth is an excellent reference guide for the language. ●

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Amiga, Atari 520, AT&T Compaq, IBM PC, Columbia, Kaypro, Osborne, RS, Sanyo	Cable	$235	$359	$215	$279	$269	$279
Print speed (cps): draft, NLQ		100, 25	180,34	120,25	100,16	120,22	120,30
Printer buffer, warranty (month)		2K, 12	2K, 12	4K,12	1K, 12	1K, 24	5K,12

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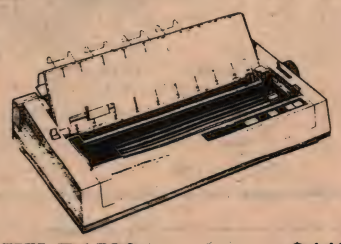

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- Print Buffer: 7K
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- IBM graphics and Epson compatible
- 15" carriage

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Productivity continued from page 67

What It Is, What It Isn't, and What You Get

I was slightly surprised to find that, even though it should be loaded last if used with memory-resident programs such as SideKick, NC itself is not a memory-resident, as the term is conventionally understood. Nevertheless, with the windows, pointing, support of mice (which I could not test, as I don't use one), and other features, there is a lot of the feel of such a program, although you don't really invoke it as you do Sidekick. In fact, Like Desktop Organizer (formerly marketed by Warner Software), it is more of a foreground application, but this is to be expected of a DOS shell anyway.

In addition to press release information, which I presume was there because the program was sent to the *Computer Shopper* as a review copy, the box contained a disk which is not copy-protected, and an indexed 5x8 manual of about 120 pages, plus a bunch of quick reference cards of various sizes. There was also a postage-paid registration card. The license information is very formal, with the usual disclaimer about Norton Computing not being responsible for any problems you may have in running the software, losing data, losing profits as a result, etc. Not very reassuring, but Norton Computing has a better reputation than one might infer from this. In fact, as is the manual in general, the tutorial is excellent, and I recommend using it all the way through before going it alone.

The disk contains a half-dozen visible programs, plus a bunch of hidden files. To access the hidden system, simply type NC after loading DOS. You might wish to create an AUTOEXEC.BAT file to make this all automatic, but remember to make NC the last ingredient.

Two panels appear on the screen, one of which is for a drive directory, the other being a status panel. You can comfortably bounce back and forth via the Tab key, and may prefer to change the second panel to be the second directory (for your second drive). The interesting thing is that you can type DOS commands as usual (you'll still see A> or your logged drive) to be implementd in the usual way, or use the NC commands via the function keys or certain key combinations, notably involving the Control key, or the Alt key for quick file selection. I did find, however, that just a CLS seemed to necessitate a disk access every time. (Why do so much just to clear the screen?) So, I question whether the program is all that independent of using the usual DOS commands directly from the keyboard. Meanwhile, the function keys provide help, menu, viewing, editing, copying, setup, quit, and more. Viewing and editing in particular are handled with respect to a given file. There is a file-selection bar (a kind of highlight, really), and such action chosen is with respect to the highlighted or selected file.

In the setup, it is easy to change defaults and even save them for future use. These include drives, color vs. monochrome, whether panel is to be visible or not, and more. F9 activates this; shifted F9 saves the changes. As you might anticipate, the ESCape key returns you to where you were before activating setup, help, view, edit.

With the edit feature (F4), you could do a quick edit of any ASCII file you have. It certainly provides a simple means of creating batch files, for instance. While this is not a word processor, it does admit simple editing, and I found the cursor movement here to be reminiscent of WordStar's. However, most simple editing can be handled with the arrow keys, page movement, home/end, etc. If you use a Tandy 1000 instead of an IBM, however, you'll find that the Norton Commander—as with other programs—require Control Home in place of Home, and Control End for End. Again, this is something about the Tandy 1000, and certainly not a reflection of anything about the software.

One good file to look at is the NC.EXT extension file, for this is the file you edit to allow you to direct load data files generated by programs such as word processors and spreadsheets. The way it works (after you've edited it to suit you, if needed) is this: When you select a file from the menu with an extension you've covered, NC loads the application program. For instance, say you have a Microsoft Word document called LETTER.DOC (DOC being a standard extension for Word), which you'll like to use or call up. You should have in NC.EXT an entry DOC: WORD ! (as shown). This tells NC that any file selected (by the file-selection bar) ending with extension .DOC is to be loaded by first loading WORD and then that file.

As another example, to load a Lotus 1,2,3 worksheet from NC, assuming that the NC.EXT file has been properly edited, you may indicate selection of the Lotus worksheet by the file-selection bar. The .WKS extension on the file selected signals to NC that it must first load 123—or the entire Lotus system, if your editing sets it up that way. However, if you edit NC.EXT in a session, changes made are not activated until you reload NC. (Remember that I mentioned that there are strong similarities to a memory-resident program?) I tried to implement this with a particular Lotus worksheet, and although I thought I followed directions, I got some kind of driver error. I caution, however, that I am not yet clear as to the source of the problem, so I'll reserve judgment on the performance in this regard. There certainly was no problem with simpler commands, such as a diskcopy batch file I created to copy from drive A to B. This part worked beautifully. (But, since my batch file was named D.BAT, invoking it from DOS is actually easier than using NC: I just type D and hit the Enter key. Of course, my work was all done in creating the batch file.)

Flexibility is a nice asset of the Norton Commander, and it allows you to customize your

continued on page 106

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Program Development — Start At The Finish

by Ronny Richardson

Last year, I wrote over twenty thousand lines of code in dBASE. This included a single database system database with over seven thousand lines of code. Over the years, I have developed a very efficient and structured approach to database systems. The purpose of this article is to share my approach to systems development. While the programs that illustrate this article will be in dBASE III, the techniques will apply to any language.

If you read this first paragraph carefully, you noticed that I said system development not programming. This is because I do more than writing a program, I design a data system. This system will by its very nature define the data that is collected and the reports that are available. This is not unique to database systems, most computer programs not only process inputs but also inputs. In addition, the output routines will limit the uses of the data.

In developing a data system, I follow the following steps:

1. Get the user to define the output.
2. Get the user to list the data.
3. Get the user to define the calculations the system is to perform.
4. Design all of the outputs the user is to get and have him "sign off" on them.
5. Design all of the data file and have the user sign off on these.
6. Write all of the menus, with "dummy calls," and have the user sign off on these.
7. Write the data input routines.
8. Write output routines.
9. Write data editing and maintenance routines.
10. Document the system.
11. Train the users.

Step 1. Get the user to define all of the outputs desired from the system both now and in the future. This important step is both the most important and most overlooked step. Most users want to discuss the data or how they will use the system. While these are important, the only way the program has to communicate is through its output. If this output is needed, then the program is a success. Otherwise, the program is a failure. The purpose of any program is to give the user output quicker, faster, or better than by hand. By knowing the desired output and calculations required to develop those outputs, I have a clear indication of the inputs

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Productivity
continued from page 105

menus. For instance, if you'd like to see more files on a screen in the directory, you can arrange this (really using DIR/W in place of DIR). Another example of flexibility comes from NC's feature of cycling through the command list—backward (to previous commands) and forward (after going backward). Nevertheless, although some of these provisions will benefit any user, the blurbs I saw for the software make clear that hard disk users are a prime target. One of the reasons is the greater need for moving through subdirectories and files. Another is the need for speed, since NC seems to be slow in certain places on my floppy-system. Not horribly so, but it's definitely noticeable.

Summary

The Norton Commander, at $75, is a well-crafted product. Its use of windows, pointing, support of mice, and other features, make it an attractive package for working with DOS. The editor alone is a nice feature, particularly for simple files such as batch files.

However, I think it an exaggeration to believe that you have much less to learn. Whether or not this shell is suitable for you depends on your use of it. With practice, you can learn to tame DOS more easily via the Norton Commander.

An appropriate analogy, perhaps, is learning to type, if you've previously handwritten. At first, you feel a bit clumsy. You wish to go back to handwriting and not learn anything new. But soon, with practice, you find that you can work much easier by typing on a nice electric or electronic machine (not to mention a word processor) than by handwriting. You don't go back to handwriting much thereafter. In this analogy, I'm learning to type, and still a bit resistant to change. I don't feel uncomfortable with the few DOS commands I use (just as one may feel comfortable handwriting), and I am not that persuaded of my need for this product.

At the same time, however, I recognize the potential of this product, and see that there are many people who would be delighted—thrilled even—to have this product. Those with hard disks who regularly deal with subdirectories will find this quite an enhancement tool.

Depending on how you see yourself, your decision to purchase or not is clear. Within that context, I offer a moderately high recommendation of the Norton Commander.

The Norton Commander sells for $75 plus $3.25 shipping/handling (plus tax for California residents). It is available directly from Peter Norton Computing, Inc., 2210 Wilshire Blvd., #186, Santa Monica, CA 90403; (213) 453-2361. For IBM and compatible computers. ●

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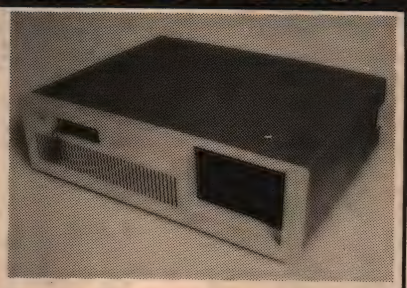

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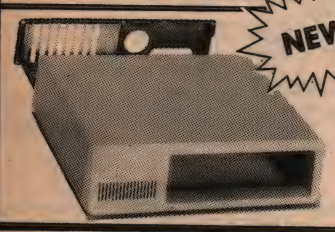

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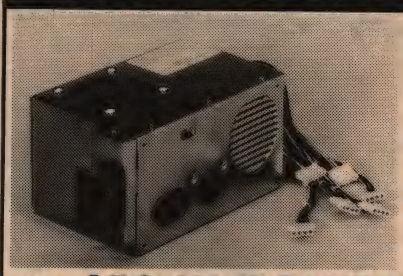

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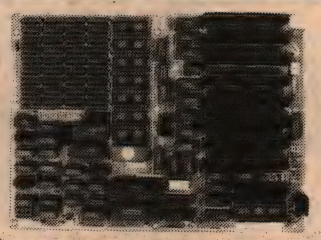

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From "C"
continued from page 67

The C language is so small that there are no direct commands to handle file or screen I/O; you must rely on outside library modules in order to perform screen and disk operations. This need not be a concern to an end user as all C compilers provide the necessary library modules to provide complete support for the screen and disk.

The most significant aspect of low level programming found in C revolves around the use of pointers. I'll elaborate on that shortly; for now all you need to know is that pointers consist of addresses which contain a certain type of data.

Characteristics of C Programs

If you had to compare C programs to any other language it would have to be Pascal. Just like Pascal, C is a highly typed language consisting of characters, integers, floating point, and double precision numbers.

All variables and pointers used in a C program must be declared before being used. While there are some additional variations to the basic types listed above, C does not permit you to create different data types as Pascal does.

The next similarity to Pascal has to do with the actual layout of a C program. A Pascal program consists of a main program module which starts with the keyword "PROGRAM" immediately followed by the name of the program. The variables are then declared and the main procedure itself begins with the keyword "BEGIN" and ends with the keyword "END." Lets look at a short simple program that prints the numbers 1 to 100 on the screen.

Pascal Version

```
program count_up;
var
  i:int;
begin
  for i: = 1 to 100 do
  writeln(i);
end.
```

In the above program, an integer "i" is entered into a simple for- loop. The loop causes the integer to be printed on the screen each time it is incremented. This program was compiled using Turbo Pascal and consisted of 11,484 bytes when in its compiled "COM" format.

Now, lets look at the same program written using C. This program begins by using a declaration of "MAIN." The parenthesis following the word indicate that it is a function as opposed to a simple variable.

The integer "i" is declared and the for- loop is initiated. It is here that you'll notice a distinct difference; the "for" loops in C are used to initialize variables, make boolean tests to determine when to stop execution, and finally may increment more than one variable. Multiple statements can be tied to the "for" statement merely by adding a couple of brackets while the Pascal version requires a "begin" and "end" to delineate multiple statements.

Finally, you'll notice the Fortran-like formatting syntax of the "printf" statement. It is important to note that "printf" is not actually a part of the C language, it is simply a compiled module which is conveniently stored away in a library.

C Version

```
main()
{
   int i;
   for(i = 0;i<101; + + i)
  printf(" % d",i);
}
```

The above listed program was compiled into an "EXE" format using Manx Aztec-C, my personal favorite. Total size of the compiled program was 4368 bytes. So, while C may look a little "funky," the savings in program size over its Pascal counterpart was 263%.

That leads me to another characteristic of C programs; they are extremely compact and operate very efficiently.

C Programs Structure

C shares a similarity with Pascal in the way it handles functions. In Pascal, functions can be passed one or more variables, usually using the stack to pass copies of the original arguements rather than the original value to be modified. When the function is done, it returns a single value. In C, they perform basically the same.

Unlike Pascal, however, C functions cannot be nested within other functions as they can be in Pascal. Furthermore, C doesn't support procedures; everything written in C is a function.

As was mentioned earlier, at least one module in a C program must begin with the reserved word "MAIN." Unlike Pascal, however, the main program may appear anywhere in the source code. In fact, the order of the functions in a C program really makes no difference to the compiler. Pascal, in contrast, requires forward declarations if functions are called before they appear in the source code.

Program Control Flow

C offers many different loop type constructs to control program execution. Many of these are direct descendants from Fortran and Pascal. C supports IF, ELSE-IF, SWITCH (almost identical to Pascals case statement), WHILE loops, FOR loops, DO WHILE loops, and the infamous GOTO.

While C does contain some idiosyncrasies, mastering the loop structure is a relatively minor problem.

Operators

As one might expect, C provides a rich repertoire of operators, ranging from simple mathematical coverage up to special functions found only in C.

Lets begin by examining the arithmetic operators. C supports addition (+), subtraction (-), multiplication (*), division (/) and modulus division (%).

Relational operators, most of which also resemble Pascal, consist of less than (<), greater than (>), equal to (= =), not equal to (!=), less than or equal to (<=) and greater than or equal to (>=).

C supports quite a few bitwise logical operators; as a matter of fact this is one of C's strong points. Found in the C language is the bitwise and (&), the bitwise inclusive or (|), the bitwise exclusive or (^), shift left (<<), shift right (>>), and the unary ones complement (~).

C has a few operators for which there really is no equal in either Fortran or Pascal. How often have you entered something like x: = x + 1 in a

continued on page 120

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Use of Textbases continued from page 104

ly limited search and collate facilities. Generally, the user has to define the keywords in advance that he may later wish to retrieve or sort. The essence of writing is that you don't know in advance which keywords may be relevant to some new creative outbreak.

Not Just A Fancy Typewriter

Word processing on a microcomputer is a wholly different medium from typing. It is fluid, organic, reflexive!

Ideas in the process of subjective thought are not developed in a linear row, end on end, one after another. They spring into the mind half-formed, like clouds in the wind, bursting forth unpredictably, now here,now there, swirling together; mixing and separating like brush fire, like smoke, taking this and that form, pausing for a moment with awesome architecture, than dissolving once again into chaos and movement.

We begin to understand that a computer can model this process and allow us to write the way we think. Hard copy imposes its own implicit ethic. The difficulty and expense (in time and money) of producing clean copies means constant pressure to limit revising and editing. There is a constant nagging pressure that has subtle effects on the production of reports, books and articles, a subtle mandate, when making revisions, to save the main structure of the work. Words already written on paper take on an authority and a permanence of their own. The writer's imagination and will are increasingly locked-in, as though engraved in granite.

We are still in the classical period of the microchip, and have not escaped from the culture and the mindset of the mechanical typewriter. Look at some of the early mainframe word processors, like IBM's Script, or CMS's Wylbur. Line editors are slow and laborious; still in use among those who do not know any better, like vestigal survivals of an ancient civilization. Look at the most recent generation of word processors. Display Writer, MultiMate, WordStar, and most of the best sellers; clearly transitional systems, stiff and clanky, only beginning to break loose from typing and discover the felicities of the new technology.

On a computer screen, words become not markers but a plastic substance, like oil paint or clay. We put a few words on the screen as though ladling globs of pigment on a canvas. We "smooshe" the words around, mixing in more color, watching to see if some errant configuration suddenly clarifies our thought. Instead of writing from beginning to end, we write from all points to the middle and back again. The process becomes circular and organic, the way cells multiply in a living creature.

With computers, we seem able to write from our guts and hearts instead of our heads. The composition seems to grow from random cells, suddenly blooming into extended ideas all over the place, changing form as though controlled by deeper processes, by natural forces unleased by the imagination.

We scroll the text and inexplicably find ourselves stopping to add a few words of stylistic change or clarification here or there; and we end up writing two new pages that we didn't even know about until we found ourselves writing it. When we edit, we often have the experience of seeing some minor cell develop into a startling new central body of the work, so that what started out to be the major idea becomes a tail on a new dog.

What Is A Textbase?

Liberated from its origins in cursive writing and typing, word processing can take on the scope, power, and immediacy for words that computers have brought to the manipulation of other kinds of data, from mailing lists to numbers. Writers require not only the flexibility and fluidity of word processing, but also its capabilities for building and accessing various kinds of text notes. "Database" is the wrong word to describe such data collections. The term "textbase" is more appropriate. Building and using a large textbase is common for writers of every kind, whether journalists, academics, novelists, or business executives.

Any good word processor has features that can be used to collect text notes, create an extensive textbase, organize and access the contents, and retrieve, copy and move parts between files and between disks.

A textbase is made up of many text notes. These are blocks of words to be saved for future consultation, citation, commentary, insertion as suits the purposes and needs of the writer of some original work: e.g. an article, report, research paper, book, what have you... This is how to do it:

Collect all text notes using a word processor of choice, whichever you find comfortable and convenient to use. But it must meet some minimum requirements. It need not be an expensive program, as long as it allows fairly large buffers (at least to 64K) and implements such functions as search/replace, block moves within the file or between files, copying regions of files to disk independently of the whole file, renaming files without exiting the program, etc.

It is desirable, indeed indispensable, that it have some windowing features that will allow the textbase to be displayed, scrolled, and edited concurrently with the work-in-progress. Having such a windowing capability makes it easier to consult the textbase while writing or easier to make block moves of all kinds from the textbase to the original work. But this is not essential. Swapping between the two will work almost as well, though this will be somewhat more awkward and time-consuming. Word processors that do not permit more than one file to be loaded into memory at a time cannot be used for this kind of writing and should be avoided. A solid freeware package like PC-write (Quicksoft Inc., 219 First N. #224, Seattle, WA. 98109. Tel: (206) 282-0452, complete copy available on disk, with documentation, $10) makes an excellent creative writing tool.

continued on page 115

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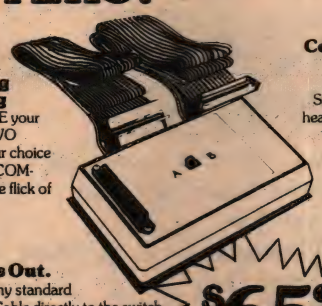

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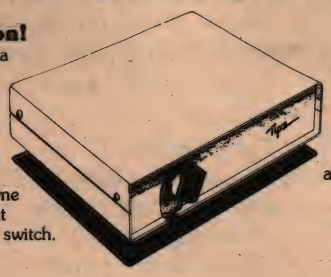

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Program Development continued from page 106

and data manipulations required.

Step 2. Get the user to list the data. The user must also indicate what data he will enter into the system now or in the future. The desired outputs will define many of the inputs. The only other inputs needed are those that may be required in the future that the user wants to plan for now. The advantage to planning for future inputs at this stage is that it is much easier to include them at the beginning.

At this stage I encourage the user to consider all possible uses for the data. It often happens that management gets some reports from the data base that they like. These then suggest other reports. There is no way to predict the exact reports in advance, and therefore code them in advance. However, it is often possible to predict additional data requirements.

For example, consider a database to store college students age, race, sex, grades, and major area. This database will report on the school's compliance with equal rights laws. It seems reasonable that future research might look at the relationship between grades and income, SAT scores, parent's education, and so on. If this data is already being collected, I would suggest including it. This would allow completing additional reports with existing data without rekeying. If the additional data were not being collected, I would press the users and management to collect it and include it in the system.

Defining additional data up front provides several benefits:

If the user is having difficulty justifying the cost of the system, the ability to produce additional reports adds value to the system.

If I am competing with others, this extra value may help me if my costs are not the lowest. It also shows that I want to help the business, not just get a programming contract.

If the company wants additional reports later, it is extra business for me.

Step 3. Find out how much of the work the system must perform, really involves finding how much dBASE the user plans to learn. Having the user type in:

```
USE Filename
SORT ON Field1 TO
Tempfile
USE Tempfile
COPY TO Filename
```

has a lower system development cost, since it reduces coding. It also has a higher system usage cost, since each new user must learn dBASE. Some users will want the system to perform the difficult steps while they perform the easier steps manually. My approach to this is that I do not allow it. I use error checks in the programs and files to store other error checks. I do not want someone who barely understands dBASE and the system design manipulating the data directly.

Once the first three steps are complete, I have all of the information I need to go back to the office and return several weeks later with a complete system. If I did, I would be in for a shock. Users often do not know much about computers or computer programs and they feel intimidated talking to a programmer. In thinking about the project later, they often come up with "wonderful" enhancements for the system. By keeping in constant touch with the user, these enhancements are incorporated into the system much earlier. The user is also often surprised about how the conversation with the programmer gets translated into a system definition, and so any problems in this area are best caught early.

Step 4. Designing all of the outputs in template form and get the user to sign off on them. This is the first real feedback that the user gets on his system. So far I have not generated a single line of code. In spite of this, I am making efficient use of my time. All of this up-front work will result in a minimum amount of change during code generation, testing, and debugging.

Step 5. Design all of the data file and have the user sign off on these. This is the last step before beginning coding. At this step I develop a detailed report on what types of data is stored in the data files. At this point the user can still make changes without a major reworking of the system. This step is important because the data that is available will limit the future uses of the system to those using the currently available data.

Step 6. Write all of the menus, with "dummy calls," and have the user sign off on these. A dummy call is where you replace:

```
CASE Pickmain = '3'
   DO Outmenu
CASE
   etc
```

with:

```
CASE Pickmain = '3'
   DO Dummy
CASE
   etc
```

where Dummy.prg is:

```
CLEAR
@ 12,00 SAY '*** THIS
ROUTINE HAS NOT BEEN
WRITTEN YET ***'
@ 14,00 SAY 'Press any key
to return to calling menu'
WAIT
RETURN
```

This allows the user to try the system without requiring a great deal of programming. Again, this gives the user one last chance to make changes before the programmer invests a great deal of time in coding. This step usually only takes a couple of hours of programming time. I have a library of all of my prior menus. I just edit those to produce new menus.

Step 7. Write the data input routines. This is the first major programming step. I write these routines first because they are the first routines the user can use. A great many systems replace manual systems. The two systems must run side by side for conversion. Under this method the side by side running can be well underway by the time system development is complete.

continued on page 128

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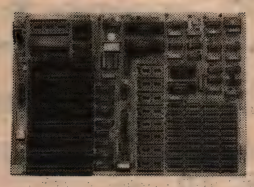

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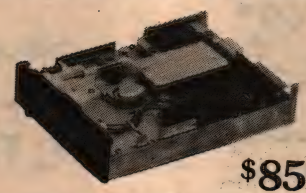

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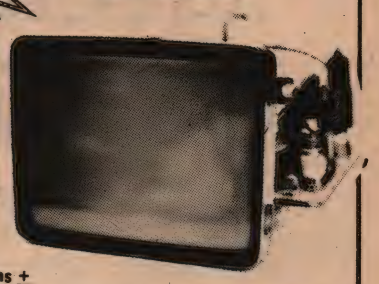

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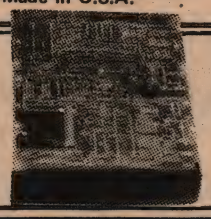

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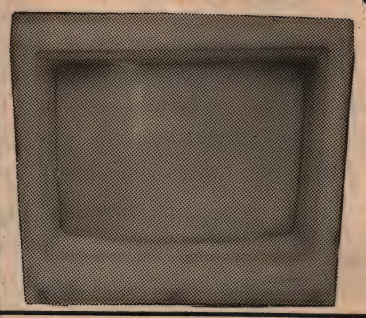

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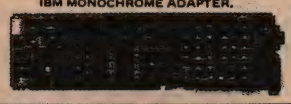

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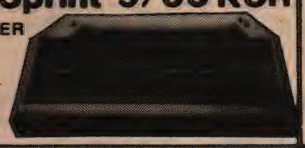

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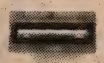

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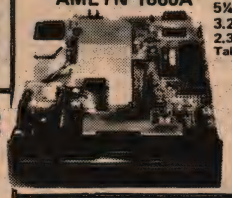

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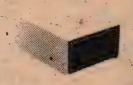

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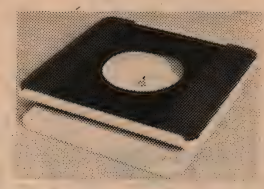

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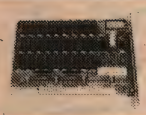

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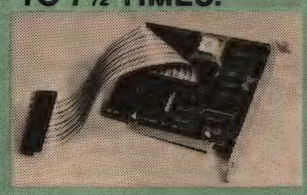

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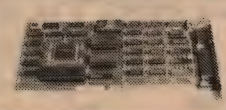

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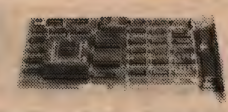

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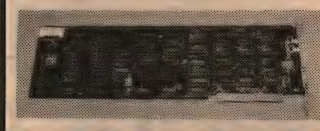

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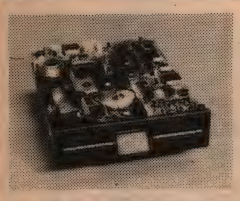

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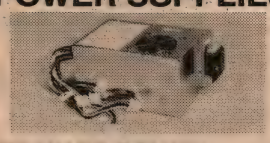

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PART #	DESCRIPTION	PRICES
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PPC301-10	10 ft.	12.00
PPC301-15	15 ft.	19.95
PPC301-25	25 ft.	24.95

IBM CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
ATSC-6	6 ft. AT serial printer cable	14.95
KEC-10	10 ft. keyboard extention	3.95
MEC-10	10 ft. monitor extention	3.95
RGB-3	3 ft. RGB monitor cable	8.95
VMC-10	10 ft. video cable RCA to RCA	2.50
DDC-22	dual floppy controller cable	6.95
HDC-22	hard drive controller cable	7.95
MPC-6	power cord	3.95

DB25 CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
25MM-6	6 ft. male to male	14.95
25MM-10	10 ft. male to male	19.95
25MM-25	25 ft. male to male	24.95
25MF-6	6 ft. male to female	14.95
25MF-10	10 ft. male to female	19.95
25MF-25	25 ft. male to female	24.95

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PART #	DESCRIPTION	PRICES
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36MM-10	10 ft.	19.95

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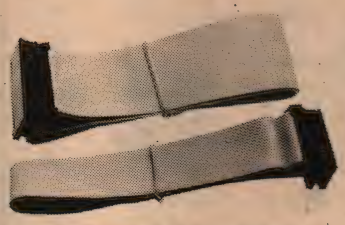
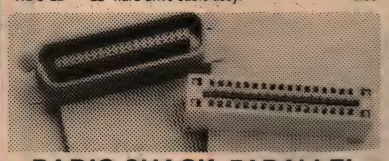


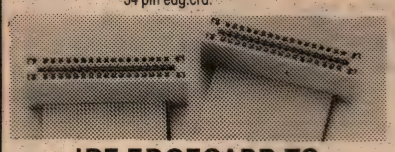
HARD DRIVE CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
HDC-22	22" hard drive cable assy.	8.50



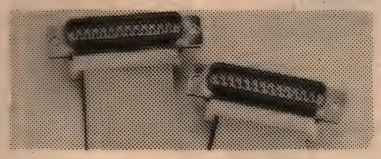
RADIO SHACK PARALLEL PRINTER CABLE

PART #	DESCRIPTION	PRICE
36P-34E	36 pin male 34 pin edg.crd.	8.50 + .68 per ft.



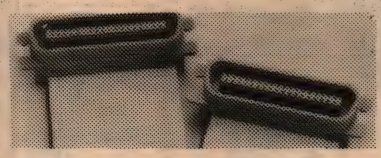
IDE EDGECARD TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10E-10E	10 pin edg.crd. to edg.crd.	3.80 + .20 per ft.
14E-14E	14 pin edg.crd. to edg.crd.	4.00 + .28 per ft.
20E-20E	20 pin edg.crd. to edg.crd.	4.50 + .40 per ft.
26E-26E	26 pin edg.crd. to edg.crd.	5.30 + .52 per ft.
34E-34E	34 pin edg.crd. to edg.crd.	5.90 + .68 per ft.
40E-40E	40 pin edg.crd. to edg.crd.	7.00 + .80 per ft.
50E-50E	50 pin edg.crd. to edg.crd.	8.50 + 1.00 per ft.



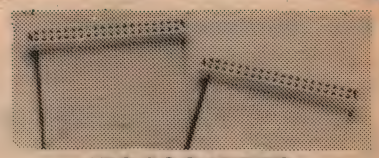
D-SERIES

PART #	DESCRIPTION	PRICE
9P-9P	9 pin male to male	5.64 + .18 per ft.
9P-9S	9 pin male to female	5.86 + .18 per ft.
9S-9S	9 pin female to female	6.08 + .18 per ft.
15P-15P	15 pin male to male	7.44 + .30 per ft.
15P-15S	15 pin male to female	7.62 + .30 per ft.
15S-15S	15 pin female to female	7.80 + .30 per ft.
25P-25P	25 pin male to male	8.96 + .50 per ft.
25P-25S	25 pin male to female	9.62 + .50 per ft.
25S-25S	25 pin female to female	10.28 + .50 per ft.
37P-37P	37 pin male to male	11.40 + .74 per ft.
37P-37S	37 pin male to female	12.46 + .74 per ft.
37S-37S	37 pin female to female	13.52 + .74 per ft.
50P-50P	50 pin male to male	25.96 + 1.00 per ft.
50P-50S	50 pin male to female	27.45 + 1.00 per ft.
50S-50S	50 pin female to female	28.94 + 1.00 per ft.



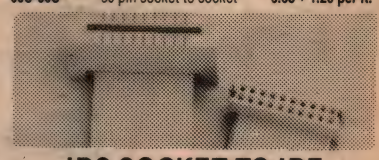
57 SERIES RIBBON CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
5724P-P	24 pin male to male	10.00 + .48 per ft.
5724P-S	24 pin male to female	10.50 + .48 per ft.
5724S-S	24 pin female to female	11.00 + .48 per ft.
5736P-P	36 pin male to male	8.00 + .72 per ft.
5736P-S	36 pin male to female	10.00 + .72 per ft.
5736S-S	36 pin female to female	12.00 + .72 per ft.
5750P-P	50 pin male to male	16.75 + 1.00 per ft.
5750P-S	50 pin male to female	16.25 + 1.00 per ft.
5750S-S	50 pin female to female	15.75 + 1.00 per ft.



IDS SOCKET TO IDS SOCKET

PART #	DESCRIPTION	PRICE
10S-10S	10 pin socket to socket	2.00 + .20 per ft.
14S-14S	14 pin socket to socket	2.50 + .28 per ft.
16S-16S	16 pin socket to socket	2.75 + .32 per ft.
20S-20S	20 pin socket to socket	2.85 + .40 per ft.
26S-26S	26 pin socket to socket	3.50 + .52 per ft.
34S-34S	34 pin socket to socket	4.10 + .68 per ft.
40S-40S	40 pin socket to socket	4.50 + .80 per ft.
50S-50S	50 pin socket to socket	6.15 + 1.00 per ft.
60S-60S	60 pin socket to socket	6.65 + 1.20 per ft.



IDS SOCKET TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10S-10E	10 pin socket to edg.crd.	3.20 + .20 per ft.
14S-14E	14 pin socket to edg.crd.	3.50 + .28 per ft.
20S-20E	20 pin socket to edg.crd.	3.75 + .40 per ft.
26S-26E	26 pin socket to edg.crd.	4.75 + .52 per ft.
34S-34E	34 pin socket to edg.crd.	5.40 + .68 per ft.
40S-40E	40 pin socket to edg.crd.	6.45 + .80 per ft.
50S-50E	50 pin socket to edg.crd.	7.85 + 1.00 per ft.

IDD DIP PLUG TO IDD DIP PLUG

PART #	DESCRIPTION	PRICE
14D-14D	14 pin dip plug cable	2.60 + .20 per ft.
16D-16D	16 pin dip plug cable	2.75 + .32 per ft.
24D-24D	24 pin dip plug cable	3.75 + .48 per ft.
40D-40D	40 pin dip plug cable	7.50 + .80 per ft.

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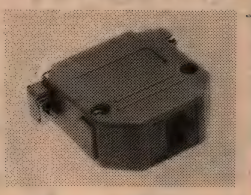

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Labels and sleeves included

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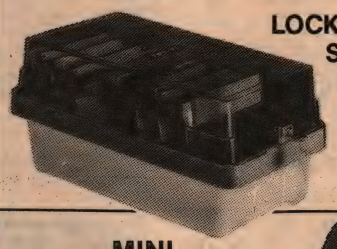

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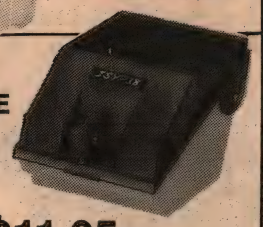

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MODULAR CONNECTIONS

TELEPHONE MODULAR CABLE ASSEMBLIES (plug to plug)

PART #	DESCRIPTION	PRICES
MC-4	4 pin cable	1.00 + .09 ft.
MC-6	6 pin cable	1.00 + .12 ft.
MC-8	8 pin cable	1.25 + .15 ft.

MODULAR PLUGS

PART #	DESCRIPTION	EA	100 EA
MP-4M	4 pin mini handset modular	0.25	14.95
MP-4	4 pin modular plug 4 x 6	0.25	14.95
MP-6	6 pin modular plug 6 x 6	0.25	15.95
MP-8	8 pin modular plug 8 x 8	0.35	26.95

MODULAR WIRE

PART #	DESCRIPTION	PRICES
MW4-100	100 ft. 4 conductor	6.95
MW4-500	500 ft. 4 conductor	29.95
MW4-1000	1000 ft. 4 conductor	49.95
MW6-100	100 ft. 6 conductor	8.95
MW6-500	500 ft. 6 conductor	39.95
MW6-1000	1000 ft. 6 conductor	64.95
MW8-100	100 ft. 8 conductor	12.95
MW8-500	500 ft. 8 conductor	54.95

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5 DISKETTE CASES FOR COLOR GUIDING YOUR DATA

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Features: STRONG METAL CASE • RFI/EMI PROTECTION • NO POWER REQUIRED • GOLD PLATED CONTACTS • COMPACT, BUILT TO LAST

(SERIAL-25 PIN)			(PARALLEL-36 PIN)		
AB25-2	2 PORT SERIAL (25 PIN)	65.00	AB36-3	3 PORT PARALLEL	107.50
AB25-3	3 PORT SERIAL (25 PIN)	82.50	AB36-4	4 PORT PARALLEL	120.00
AB25-4	4 PORT SERIAL	95.00	AB36-5	5 PORT PARALLEL	145.00
AB25-5	5 PORT SERIAL	115.00	AB25-X	SERIAL CROSSOVER SWITCHBOX	87.50
AB36-2	2 PORT PARALLEL	92.50	AB36-X	PARALLEL CROSSOVER SWITCHBOX	117.50

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4 circuit with surge and noise suppression

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VCN6-6

6 circuit with surge and noise suppression

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CUBE SURGE PROTECTORS

Here's a lot of protection in a small package.

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- Easily transportable
- Low cost protection

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Use of Textbases continued from page 109

How To Begin

So far as possible, make your extracts and reading notes at the computer; spare yourself the intermediary steps of handwriting or typing notes, unless you need an on-the-spot record and do not find it convenient to get out the lap-portable. If you are working in a library, often you cannot take the source volumes from which you wish to make extracts and notes to a computer; but that is changing. Just as they now provide xeroxing equipment in the reading rooms, libraries are coming to realize the necessary link beween source and computer as well.

Type in the notes without too much regard to identifying or organizing them. If extensive notes are to be taken from a single source, it is a good idea to keep them all in a single file, whose name identifies the source. Be sure to put in complete bibliographical data (once is enough at the head of a file), give the specific page numbers for every extract, and separately identify any comments or connective materials which you originate as you type material from the source. It is especially important to expatiate your comments on the texts as you go along. Such analytical remarks are the seeds of an original work. When you reach the point of assembling your notes into a finished article or chapter, much of it will already be written for you!

Save the notes to disk then without regard to any more rigorous organizational structure. Each extract in a file should have a preliminary label roughly related to its contents. For example, the label can be some descriptive name, such as the main subject of the excerpt, or the name of the source, author, subject matter or key word, etc. Use a standard format for each entry, such as author, book title. Make sure each note and text quotation contains page numbers from the related source. Use "self" for any text originated by the user. Include "notes to yourself" reminding you to look up a word in the dictionary or check another source or think some more about a concept.

After each note, skip a few lines and type in the next one, and so on. All kinds of notes, of various lengths can be entered end on end willy nilly at this stage. Merely add them in the order they originate, filling up each file (let us say to about 64K, to make them more manageable), and filling up each disk in the same way. When each disk is full, back it up and label it as to general contents.

While collecting data by this method, stop from time to time, perhaps every week or so to do some rough preliminary collation of your notes. This is done by creating a new file, using the search/locate features of the word processing program, then use mark block, move block, and copy block routines to recombine notes as appropriate into files with more specific and more descriptive labels. Resave to disk the newly sorted files.

Refining The Process

As research, note-taking, and writing proceeds, continue this process of refining your data collection by reorganizing files on a regular basis. The process is always the same. Move things together that seem to belong together. Often you will want to keep some of the same notes intact in more than one file or disk. That is an excellent idea, because you do not wish to foreclose any options of future reorganization of your material in the light of dazzling new ideas and insights that can come at any time. Keeping open for as long as possible the options of reorganization is one of the most revolutionary modes of writing that computers make possible!

Example: You decide that you want all references to Beethoven together in one file, or in several files on the same disk. Let us assume that you have collected several dozen files on four or five disks, completely uncollated. Using the search/locate/find (whatever it may be called) utility built into your favorite word processor, scan through each disk in turn looking for references to Beethoven. Each reference with associated material can be marked and moved or copied to a new file, or transferred to a new disk.

Then, it happens that you want to examine every reference to his deafness. Using the search utility once more, the user looks at each occurrence of the word "deafness" in the Beethoven files. Such blocks of text as may seem of interest and make reference to Beehoven's deafness are marked and transferred to another file named "deafness," and so on.

Once this has been accomplished, you can bring up a batch of these notes with the word processor and re-arrange all "Beethoven deafness" texts according to some system or purpose, such as chronologically, alphabetically by title or author, or according to some logical progression of ideas.

As the project continues, one discovers new organizing principles (for example: "his deafness and sexual life") for notetaking and organization. Respond by recollating the notes with such new key words as may seem important or interesting.

Throughout this process, one might wish to keep the text notes intact from each previous stage of the collation, for other and future uses.

Use of these methods will permit the material to sink into the subconcious of the writer, will model in a recorded and accessible fashion the real process of creativity, and will actually produce at each stage an even more finished piece of work.

When one is ready to stop collecting and ready to sit down and write an actual article or book, one has greatly simplified the task. Set up a file for the draft version of the article or for chapter one. Copy to the same disk all the notes, extracts, pieces of text that are candidates for inclusion. Bring up the files and use the search routine to find the parts you

continued on page 116

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7413	.35	74116	1.20	74194	.80		
7414	.45	74121	.30	74195	.75		
7416	.25	74122	.45	74196	.80		
7417	.25	74123	.45	74197	.80		
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7432	.27	74151	.55	74298	.60		
7437	.27	74153	.55	74365	.65		
7438	.29	74154	1.25	74367	.65		
7440	.20	74155	.55	74390	.90		
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7445	.65	74157	.55	75325	1.50		
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74C10	.25	4006	.65	4034	1.40	4082	.20
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74LS13	.25	74LS145	.70	74LS258	.45
74LS14	.36	74LS147	1.00	74LS259	1.20
74LS15	.25	74LS148	.90	74LS260	.45
74LS20	.17			74LS266	.55
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74LS22	.22	74LS153	.39	74LS279	.39
74LS26	.23	74LS154	1.50	74LS280	1.70
74LS27	.23	74LS155	.55	74LS283	.55
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Compuware Corporation Announces Powerbase 2.2

PowerBase 2.2, the latest release of the popular database manager for IBM and Wang PCs, is now available. One of the major new features of PowerBase 2.2 is enhanced performance and speed—PowerBase 2.2 is a minimum of 21% faster than the earlier release.

PowerBase 2.2 is the first release since PowerBase Systems, Inc. was acquired by the Compuware Corporation in September, 1985. "We regard this as a 'growth release,'" said Paul LaPorte, director of marketing for PowerBase. "We have taken the time to make a lot of internal changes to the product. PowerBase 2.2 provides our users with increased performance in the short run.

"PowerBase 2.2's enhanced performance is due primarily to the new way the program handles indexed fields," LaPorte continued. "We've increased efficiency by changing PowerBase's access method."

A Convert program provided with the upgrade lets users of previous PowerBase releases easily make their applications fully compatible with PowerBase 2.2. Users just type "CONVERT" and the application name, and the program does all the work.

Some of PowerBase 2.2's other enhancements:

**More compact data files*—Most PowerBase data files take up less disk space than before. A PowerBase 2.2 file with more than 1200 records and six indexed fields needs less than half the disk space required by the previous PowerBase release.

**More records*—With 2.2, users can add more records to a PowerBase data file that has multiple indexed fields.

**Links to WordPerfect and Lotus 1-2-3's Release 2*—PowerBase 2.2 links to WordPerfect, SSI Software's best-selling word processing package, and Release 2 from Lotus 1-2-3. Through PowerBase's PowerLinks command, users can transfer PowerBase data into WordPerfect for use on merge print letters.

**Better support for macro packages*—PowerBase 2.2 provides better support for users of macro software packages. "Many of our users like to run PowerBase unattended," LaPorte remarked. "They are using software like SuperKey by Borland International, Prokey by Rosesoft, and RE/Call by Yes Software With PowerBase." With a macro package and PowerBase 2.2, users can easily run long reports and labels unattended over long periods of time.

These and numerous other changes to PowerBase 2.2 make the product more versatile for business applications.

For additional information contact Compuware, 32100 Telegraph Road, Birmingham, MI 48010; (313) 540-0900.

Mention that you read about it in *Computer Shopper* ●

Use of Textbases
continued from page 115

want to transport into that file. Mark and copy these into their tentative places in the work in progress.

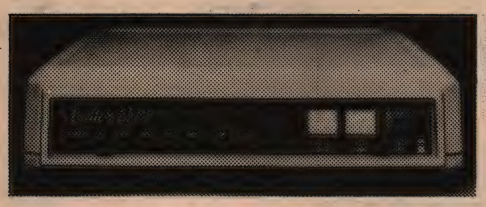
At this stage, windowing capability in the word processor program is desirable; and at least, the ability to load several buffers, swap the screen display quickly from one to another, and cross-edit between buffers.

Read and edit it through, adding more connective material, cutting and pasting, pursuing new ideas as they occur and possibly transporting other material from other files and disks, resaving to disk anew the emerging product of each work session and backing up the disks at the end of the day's work.

After a session of moving "raw" blocks of notes to the work-in-progress, and arranging them, one can work through the files adding connective passages and other material, revising and polishing to take out the bumps and stops, tightening and adding flights of inspired prose, eventually adding a good introduction and conclusion, and ... Voila!

Another masterpiece ready for the publisher! Incrementally, step-by-step, a larger work evolves by this system; not painlessly, (who says creative work should be painless?). But relentlessly and irrevocably, the larger work emerges, occasioning enormous satisfaction to the writer, if not to anyone else.

In short, as a method of creating and managing working files of long text notes, as a method of using a word processor for organizing and writing research reports, creative fiction, or business documents, the use of this method frees the writer from the stiff, linear constraints of earlier technologies, and realizes the fluid, reflexive, and organic processes of his/her own creativity. ●



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$ 695 (Kit = $ 650)

PCFX XT TURBO compatible. 4.77 & Full 8 mhz clock. 67% Faster then IBM.

Features: 640K RAM installed, 1-360K Drive, TTL Amber Monitor, Mono-Graphics w/Parallel Port. Runs all software we tried at better then 65% Faster then IBM's XT.

$ 765 (Kit = $ 675)

a286 IBM AT compatible. 1 Meg RAM, 8 mhz clock.

a286 Starter (complete system w/Quality Monitor):

Features: 1-360K Drive, Floppy Contrller, Mono-Graphics card w/Parallel Port, TTL Amber Monitor w/ swivel base. USA made quality AT-Keyboard. Tested to run Xenix and DOS software.

$ 1395 (Kit = $ 1295)

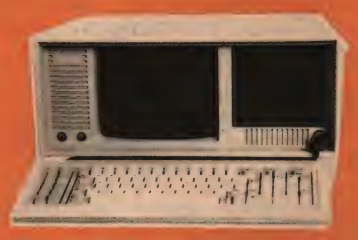
a286 Pro

Features: 1-1.2 Meg Drive, Floppy/Hard Disk Controller Hard-Disk Ready, Mono-Graphics w/Parallel, TTL Amber Monitor w/swivel base & Anti-Glare filter built-in. USA-made AT-keyboard.

$ 1695 (Kit = $ 1595)

33 Meg 40ms Hard-Disk for At or a286 **$ 590**

ATP-FX / ATP-286 FX & a286 Affordable-Trans-Portables. Same basic features as the FX & a286, but in a luggable-portable-affordable case. 9" TTL Amber Monitor. 6 slots total.



Add $ 150 to FX or a286 prices above for portable version.

NOTE: All ISHVAR systems w/Hard-Disks include over 4 mega-bytes of Public-Domain / Freeware.

On the above ISHVAR systems add:

$ 175	for Everex Edge card / runs color software on TTL or RGB
$ 210	for 13" RGB mon. & color card / replaces Mono-card & mon.
$ 585	for 14" EGA-RGB mon. & card / replaces Mono-card & mon.
$ 50	for Ser-Port & Battery-Clock card. (SX & FX only)
$ 60	for Ser/Par/Game/Bat-Clck & Floppy cntrllr / replaces standard Floppy cntrlr card. (SX/FX only)
$ 35	5151 style or USA made AT style keyboard (SX/FX only)

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Citizen 120-D	120 cps Dot-Matrix 10"	$ 198
Citizen MSP-10	160 cps Dot-Matrix 10"	$ 295*
Citizen MSP-15	160 cps Dot-Matrix 15"	$ 405
Citizen MSP-20	200 cps Dot-Matrix 10"	$ 395
Citizen MSP-25	200 cps Dot-Matrix 15"	$ 560
Citizen Premier-35	35 cps Daisy-wheel (inclds tractr)	$ 525
Huston Instruments	Plotters & Digitizers	$Call
Parallel printer cable	(length = 6 foot)	$ 012
LePrint Software	standard package w/5 type styles	$ 140*
Fontrix & Printrix	Graphics & Typesetting software	$Call
--LAZER Printers--		$Call

* Over 95% of this ad has been type-set & printed using the LePrint software and a Citizen MSP-10 printer on the a286. (Copy was reduced slightly)

WATSON

1200 Baud - Data - Voice Record/Play interactive system $ 400

Monitors:

12" TTL Amber	$ 98
12" TTL Amber w/built-in swivel base	$ 115
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14" EGA Mitsubishi 640x350 EGA-CGA Monitor	$ 485
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Micro-Vitek 895/DU 14" 800x400 w/Ultra-Graph-800 card	$1635
Micro-Vitek 905/DN 14" Analog RGB w/Quintar Graph-Port-D card (832x630x120 colors)	$2430
Micro-Vitek 945/CN 20" Analog RGB w/Viva-Gold card (1300x800x upto 512 colors)	$3570
WYSE Terminals also available	

Add-ons:

AT HD/FD cntrlrs w/cables	$ 195
Everex Edge card (runs Color sftwr on TTL mon.)	$ 250
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Micro-Soft Bus Mouse w/PC-PaintBrush	$ 128
20 Meg XT Hard-Disk, 1/2 hi w/contrlr	$ 415
30 Meg 1/2 hi w/controller	$ 525
60 Meg 1/2 hi w/cntroller	$ 995
120 Meg full hi w/controller	$1420
10 meg 1/2 hi internal Removable Hard-Disk w/cntrlr	$ 850
20 Meg AT Hard-Disk (40 ms) Seagate	$ 520
30 Meg AT Hard-Disk (40 ms) Seagate	$ 590
20 Meg Irwin Tape-Back-up (uses floppy controller)	$ 375
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An end to diskette lies!

Super Star™ Diskettes are of equal or *higher* quality than 3M, Maxell, TDK

and many other "famous" brand names. They simply cost about half as much!

Super Star™ diskettes are manufactured to equal or exceed the same specifications as 3M, Maxell, TDK and many other "famous" brand name products.

They are designed for 60% or higher clipping levels, not the 40% used in IBM and ANSI standards. Each is guaranteed for ten million read/write passes. Every Super Star™ diskette is 100% verified and carries a LIFETIME WARRANTY!

Yet Super Star™ diskettes cost only about half as much...

How can we deliver Super Star™ diskettes of such high quality at such a low price?

Simple...we don't make fools out of our customers.

We bargain hard with the same people who turn out many of the "famous name" brands. Their manufacturing capacity far exceeds their capability to sell everything they make. So, as large scale purchasers, we are able to obtain significantly lower prices than others for ***high-quality*** diskettes.

For example, we pay one of the big name manufacturers 98¢ for their "famous name" diskette in a pretty box. In an unequalled display of favoritism, that same manufacturer sells the same diskette in the same fancy box to a major corporation for 42¢ each. Finally, a software duplicator can buy the same diskette *without* the box for 37¢!

A 265% price difference: for what?

In the example above, that's a difference of 265% in price for the very same diskette!

So you see, paying for a "famous name" on a diskette doesn't guaranty you that you're getting any more for the money.

You may be paying for some big corporation's fleet of aircraft and their executive retreats in Minnesota and Canada, but you are not paying for any more quality.

You're simply getting rooked out of money you could have in your own pocket.

There are four kinds of diskettes: And Super Star™ is right up there with the best.

As you leaf through the pages of this magazine, you will see diskettes advertised at prices as low as 33¢. Every one, of course, claims to be the "best".

It's simply not true.

Here are the only kinds of diskettes you can buy:

High-Clip Product: this is what you get when you buy Super Star™, 3M™, Maxell™, TDK™ or any number of other famous and not so famous name diskettes. They have clipping rates of 60% or more, are certified for ten million read/write passes or more and are simply the best diskettes available. You can expect perhaps 1 out of 100,000 to fail...and that will usually be the result of dirty or misaligned drives.

ANSI Spec Product: These are "okay" diskettes. They have a clipping level of 40%. Usually they are the fall-out from a manufacturer's "high-clip" product line. You can expect about 1 out 20 to fail in normal use. (But that failure rate has more to do with the disk *drive* rather than the diskette.) The price difference between an ANSI-spec disk and a High-Clip product is only a few cents. But the failure rate of ANSI product is 50,000 times higher!

Duplicator Product: This is a catch-all category. Some of it may be High-Clip Product, some ANSI spec, some cosmetically blemished, some garbage. Usually anyone who buys product in this class justifiably anticipates that 20 out of every 100 diskettes will not format properly.

Floor Sweepings: This is just plain "garbage". For example, the 5.25" SSSD diskettes that you see advertised for 39¢ are exactly that: garbage. No decent manufacturer has sold any 5.25" SSSD diskettes in several years. SSSD is the absolute bottom of the line in terms of quality. Most of the discount diskettes you see advertised are "floor sweepings"...bought up by brokers and passed on to the unsuspecting public by unscrupulous merchants who are simply out to make a fast buck.

When every bit counts, you can count on Super Star™!

Well, I wish we had more space, but we don't.

So, here's the message in a nutshell:

1. Super Star™ diskettes are high-clip product, 100% certified, tested to 60% or higher clip levels and not less than ten million read/write passes.
2. Super Star™ diskettes carry a LIFETIME WARRANTY.
3. Super Star™ diskettes equal or exceed the published specifications of such "famous" brand names as 3M, Maxell, TDK, etc.
4. Super Star™ diskettes give you this quality *at about half the price of the big names!*

Save your money: buy Super Star™ diskettes!

That's the message:

Super Star™ diskettes mean the highest quality at about half the price!

SUPER STAR SPECIAL!

Your choice of storage for $ 4.95!

Buy 50 Super Star™ diskettes of either size and you can get a nice plastic storage case for only $ 4.95 (shipping included!).

These are durable plastic cases with dividers.

The 5.25" unit holds 50 diskettes and the 3.50" unit holds 40 diskettes.

5.25" Storage Unit (P/N3100) $ 4.95ea.
3.50" Storage Unit (P/N3102) $ 4.95ea.

Super Star™ 5.25"

SSDD	(P/N3800)	**.55ea.**
DSDD	(P/N3801)	**.62ea.**
SSDD96	(P/N3802)	**.78ea.**
DSD96	(P/N3803)	**.82ea.**
DSDDHD	(P/N3804)	**$ 1.61ea.**

ORDER IN MULTIPLES OF 50 ONLY!

All Super Star 5.25" Diskettes are poly-bagged in lots of 25 with Tyvec sleeves, write-protect tabs and user ID labels

QUANTITY DISCOUNTS: 350-500 diskettes, deduct 3%. 550-700 diskettes, deduct 6%. 750-1,000 diskettes, deduct 9%. 1,050+ diskettes, deduct 12%

Super Star™ 3.50"

SSDD	(P/N3805)	**$ 1.52ea.**
DSDD	(P/N3806)	**$ 1.67ea.**

ORDER IN MULTIPLES OF 50 ONLY!

Super Star 3.50" diskettes are packaged in boxes of 50 with user ID labels.

QUANTITY DISCOUNTS: 350-500 diskettes, deduct 1.5%. 550-700 diskettes, deduct 3%. 750-1,000 diskettes, deduct 4.5%. 1,050+ diskettes, deduct 6%.

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SHIPPING: 5.25" & 3.50" DISKETTES-Add $ 3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add $ 5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except as shown above. **TAXES:** Illinois residents add 7% sales tax.

MINIMUM ORDER: $ 35.00

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The greatest value ever
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Buy 10, get 12 and a FREE storage case!

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...get 12 instead of 10 and
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Qty.50 Qty.50

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Regular BASF Price List:

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SSDD (P/N3406)	.81	.79	.72 *
DSDD (P/N3407)	.92	.90	.83 **
SSDD96 (P/N3404)	.92	.90	N/A
DSDD96 (P/N3405)	1.03	1.01	N/A
DSDDHD (P/N3403)	2.07	2.04	N/A

* Bulk is (P/N3408) **Bulk is (P/N3409)

Regular (non-bulk) product is packed 10 to a box with Tyvec sleeves, user-ID labels and write-protect tabs. **BULK** product is in cartons of 150 diskettes with Tyvec sleeves.

3.50 Diskettes:	Qty. 20-40:	Qty. 50+:	(BULK) 200+:
SSDD (P/N3402)	1.53	1.48	1.52
DSDD (P/N3412)	2.06	2.01	2.05

BASF 3.5" diskettes, exept for bulk, are packed in boxes of 10 and include user-ID labels. BASF bulk productt is in boxes of 100and includes user-ID labels.

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DISK CADDIES(P/N2200) Beige. Holds 10 diskettes. $ 1.65 ea. + .20 Shpng.

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(In Illinois: 1-312-256-7140)
INQUIRIES:
1-312-256-7140

FOR FASTEST SERVICE, USE NO -COST MCI MAIL. Our address is DISKORDER. It's a FREE ,MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5.25" & 3.50" DISKETTES-Add $ 3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add $ 5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except as shown above. **TAXES:** Illinois residents add 7% sales tax.

MINIMUM ORDER: $ 35.00

DISK WORLD!, Inc.
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DISK WORLD!, Inc.

An extraordinary value for readers of Computer Shopper!

You can buy Super Star™ diskettes at the 1,000 piece price ...but only buy 100.

50¢ <= SSDD
DSDD => 56¢

You save more than 10%!

Super Star™ diskettes equal or *exceed* the quality standards of "famous" brand diskettes like 3M, Maxell, TDK... at half the price or *less* and we want you to see it for yourself!

COMPUTER SHOPPER readers are among our favorite customers.

They are among the most sophisticated buyers we have. They know their products, understand the meaning of quality, are highly price conscious and won't be fooled...at least not more than once.

A compliment repaid...

Because **COMPUTER SHOPPER** readers are among the most mail-order oriented computerists to be found, we are making a special offer on our **Super Star**™ diskettes for this one issue only.

You can buy Super Star™ diskettes at the 1,000 piece price in lots of 100!

Super Star™ diskettes are a great buy at their regular price.

But we want to make you an offer you can't refuse.

Because we want to show you that **Super Star**™ diskettes are equal to or better than the so-called "famous name" brands at half the price or less.

And we also want you to see that **Super Star**™ diskettes are clearly superior to a lot of the "junk" diskettes you see offered at 39¢ or 33¢ in lots of 10,000 and other ridiculous offers like that.

You deserve the best at the lowest prices with the least risk!

So, this special offer for **COMPUTER SHOPPER** readers: order 100 of our **Super Star**™ diskettes at the 1,000 piece price.

Try them. We think you'll like them.

If you don't, just return them for a full refund.

Obviously, we feel that you're going to find what thousands of others have already learned:

Super Star™ **diskettes offer more for less money!**

DISK WORLD!, Inc.

This special offer valid for this issue only!

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64K	120ns	1.35
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Epson LX 80 Nylon Black	5.80	5.00	4.25
COLOR	7.55	6.55	5.50
IBM Proprinter Nylon Black	7.75	6.70	5.70
COLOR	8.85	7.70	6.50
Okidata 80/82/92 (Spools) Nylon Black	2.25	1.95	1.65
COLOR	3.35	2.90	2.45
Okidata 182/192/193 Nylon Black	8.80	7.60	6.45
COLOR	9.90	8.60	7.25
Panasonic KX-P 1090 Nylon Black	11.50	10.00	8.50
Qume IV M/S Black	5.70	4.95	4.00
Tally Spirit 80 M/S Black	8.00	6.95	5.90
Texas Instrument TI 850/860 Nylon Black	6.80	5.90	5.00

"COLORS" available are RED, BLUE, GREEN, BROWN
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Sharp Expands PC Line With AT-Compatible Unit

Sharp PC-7000

Following its highly successful first venture into the IBM-compatible market with the lightweight PC-7000 personal computer, Sharp Electronics Corporation has added an AT-compatible desktop model to its computer lineup. The new PC-7500 will be available through the same distribution channels that have made the PC-7000 one of the hottest-selling transportables on the market.

"With the PC-7500, we continue to emphasize the value and price/performance that is coming to be associated with the Sharp logo," says Bill Robinson, Sharp's Systems Division general manager. "The unit's suggested retail price of $2,995 and its full complement of PC/AT features will further enhance Sharp's position as a formidable market force, offering the diverse product line and corporate commitment needed to survive in this increasingly competitive market."

The standard PC-7500 features an Intel 80286 processor capable of running at either a 6MHz or 8MHz clock speed, a combination of double-density or high-density half-height floppy disk drives, and 512K of on-board random access memory, which can be expanded to either 640K or 1MB on the main board, with 16MB addressable on expansion boards.

Other standard features include a compatible keyboard with PC and XT software interfaces, a 16-bit hard disk controller board, a clock/calendar with battery backup, serial and parallel ports to the main board and a socket for an 80287 math coprocessor. MS-DOS 3.1 and GW-BASIC 3.1 software are included. An optional 20MB hard disk drive is available, along with optional monochrome and color display adaptors.

"Everyone has been waiting for the Japanese companies to make a major impact on the U.S. personal computer market, as they have with so many other peripheral products," says Robinson. "With the success of our PC-7000, and now with the PC-7500 introduction, we have clearly established ourselves as one of the foremost Japanese entrants into the U.S. market."

"The AT-compatible market is an extremely competitive one," he continues. "But we feel that in the long term only a handful of companies will survive. We intend to be among that handful, and are counting on the Sharp name and quality reputation to differentiate us from the pack."

For additional information contact Sharp Electronics Corporation, Sharp Plaza, Mahwah, NJ 07430; (201) 529-8971.

Mention that you read about it in *Computer Shopper*. ●

From "C" continued from page 108

Pascal program? Well, in C all you need to type is + + x and x is incremented automatically. To subtract one from x is just as simple, − − x!

How about the typical expression x: = x + 10. Well, C has a shorthand method for that as well, x + = 10. This results in the 10 being added to the value of x. Subtraction is just as easy, for example y − = 10 results in exactly the same result as you would obtain by writing y = y − 10.

Finally, C offers another operator which is referred to as the conditional expression. A Pascal expression written such as: if (a > b) then z = a can be rewritten as z = (a>? a : b.

All in all, C offers an excellent collection of operators.

The C Library

C wouldn't be C without the extensive libraries which, along with providing necessary I/O control, also provide for a wide range of string handling commands, memory management commands, data conversion routines and program management utilities.

The standard C library consists of around 200 such library modules. While the operation of an individual library file may vary substantially from system to system, the C language interface using that function remains the same. This is how C offers such a great deal of portability.

Structures And Unions

One feature C shares with high level languages lies in its support of structures. A structure in C is quite similiar to a record in Pascal—it is a collection of one or more fields, all of which are contained under a single variable name. Unlike languages such as Pascal, however, C offers only limited support in this area.

The only operations permitted are to access members of the structure and to get its address. Its main limitations are that you cannot copy a structure as a unit and they cannot be passed to or from a function (probably for the same reasons that arrays aren't).

The other complex data structure, called a union, actually resembles Fortran's COMMON command more than any Pascal command. A union is basically a block of memory set aside to hold one or more objects of different size. The C compiler allocates space for the largest requirement and set i.

Pointers

It should come as no surprise that the most powerful feature of the C language is also the one that causes the most problems. Ask any programmer new to the C language what his least favorite feature of C is and he'll probably say pointers.

All of you have unknowingly used pointers before; in high level languages a variable name is merely a pointer. Simply defined, a pointer is a variable that contains the address of another variable.

The C programming language makes extensive use of these pointers due to the fact that pointer arithmetic is faster

continued on page 127

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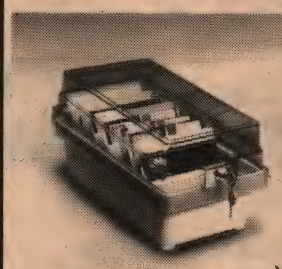

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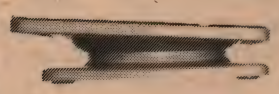

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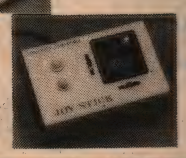
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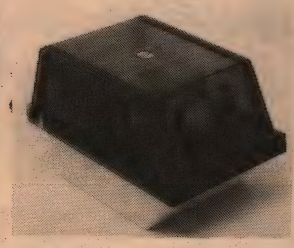

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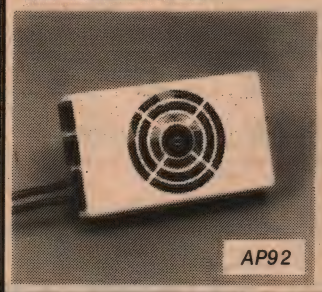

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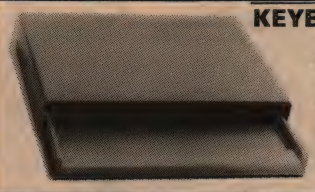

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Hewlett-Packard Offers PC-AT Compatibility

In conjunction with Phoenix Software Associates Ltd., Hewlett-Packard Company has developed an 80286-based coprocessor interface card that provides PC-AT MS-DOS software compatibility to the HP 9000 Series 300 technical workstation.

PC-AT on a Plug-in-Card

The DOS coprocessor system consists of a variety of hardware and software components. When combined with the DOS coprocessor software, the hardware plug-in card provides all the necessary components of a PC-AT software-compatible environment, including an 80286 processor with a socket for an 80287 numeric coprocessor, completely contained on one 5¼-inch by 6½-inch DIO interface card. This is the same type of card used in the AMQ-286 described in the July issue.

MSDOS Software on HP 9000 Series 300

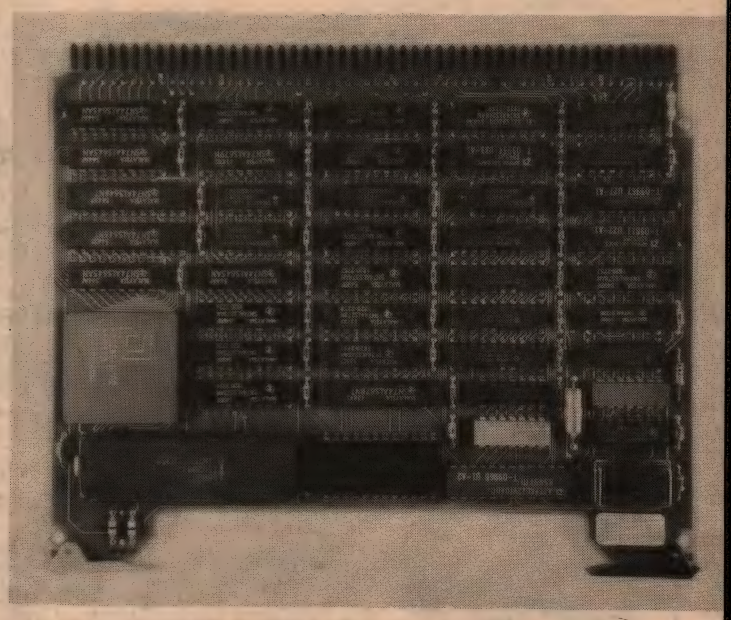
Running in an HP-UX environment, the HP Series 300 DOS coprocessor bridges the gap between the UNIX and MS-DOS operating systems, creating a dual-purpose computer.

The Best Of Both Worlds

The HP 9000 Series 300 is a high-performance technical workstation based on the Motorola MC 68010 or the MC 68020 processors and uses the HP-UX operating system, which adheres to AT&T's System V interface definition Issue I.

The Series 300 handles technical applications in design, software programming, electronic engineering, instrument control or computer-aided test.

With the addition of the HP Series 300 DOS coprocessor, this technical computer also can function as a personal computer. By having access to thousands of MS-DOS applications, productivity is increased on the Series 300 by easily handling everyday routine tasks, such as word processing, presentation graphics, project management, database management and spreadsheet analysis.



Pheonix 286 Coprocessor Plug-in Card

The DOS coprocessor software consists of many elements, including a PC-AT compatible version of MS-DOS—configured to emulate IBM's PC-DOS TM 3.1—Vectra's Personal Applications Manager (PAM), an extensive utility set, and utilities to interchange BASIC, Pascal, or HP-UX ASCII files with MS-DOS format.

The 80287 numeric coprocessor enables the coprocessor card to perform high-speed arithmetic and logarithmic functions, and trigonometric operations. It operates at 4.77 MHz, and can execute concurrently with the 80286 to achieve higher performance.

MS-DOS Integration With HP-UX

The coprocessor is based on HP-UX and requires either the application-execution environment (AXE) or the HP-UX programming environment. MS-DOS operates as a true HP-UX task. This offers MS-DOS integration with features of HP-UX, such as networking (uucp, cu, LAN), multi-tasking, windowing and file sharing between HP-UX and MS-DOS (one DOS task and one DOS window).

If it's preferred that the system comes up in MS-DOS, and the user does not require access to HP-UX features, the non-required portions of HP-UX can be removed by the DOS coprocessor-installation procedures. These features can

continued on page 130

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Columbia computers were voted first in their class last year — TWICE! First, their products were voted the most compatible and well-built PC's in the industry. Second, Columbia had the distinction of being voted the company that dealers least wanted to represent. In fact, the primary reason Columbia failed was their unfortunate lack of concern for their customers and dealers.

During the last year, however, Godfather's has become the largest "unauthorized" Columbia dealer in the nation. And if you ask anyone about doing business with Godfather's, they will probably rave about our good service and support. Godfather's has always believed that being responsive to our customers is what has made us successful. In fact, a high percentage of our business comes from other dealers who know they can depend on us to get them the answers they need . . . when they need them! They have also found that they need us less often because of our attention to detail before the sale. (For example, while most other suppliers ship their products in unopened factory cartons, Godfather's opens the box and performs testing, adjustment, and alignment of every computer, monitor, and disk drive we sell. As a result, our customers should have no problems when they receive our product.)

I think it's obvious that Columbia's reputation for quality products, coupled with Godfather's reputation for quality service and support, make an ideal team. We recognize that treating our customers, whether they are dealers or end users, the way that WE have always wanted to be treated (but seldom were) is the ONLY way we will be successful.

SO WHAT ROLE WILL GODFATHER'S ACTUALLY PLAY IN THIS TEAM?
While Godfather's will remain a separate corporation continuing in its current direction, it will provide the resources to get the new Columbia going strong. Godfather's knows how to market the Columbia products in a manner which inspires confidence in our customers. During the start-up of the new corporation, Godfather's will contribute the financial backing, purchasing, and marketing expertise to establish a strong emphasis on quality, service, and maintaining a high regard for the customer in each and every sale. We have also expanded our technical staff by adding additional software and hardware engineers to assure continued compatibility in our products.

SPEAKING OF PRODUCTS, WHAT DO YOU PLAN TO MARKET INITIALLY?
We finally have our new computer!! It is not just an "XT" or even a STANDARD "AT" . . . IT IS A SUPER "AT"!!! . . . THE COLUMBIA AT-6000!!! . . . with more of everything for those who want the best. While I don't want to cover all the details here, it does come with lots of bundled software (including MS-DOS 3.2 and BASIC, as well as a library of applications), a 20MG hard drive, 5 half-height drive slots (4 of which are user accessible), 12 expansion slots, and a 230-watt power supply. It runs all the software we have seen that runs on the IBM-AT, as well as UNIX!! UNIX does not run on many of the other compatibles we have tried. Additionally, it is fully FCC certified, stickered, AND meets all the FCC regulations!! (It's fine for some companies to offer one and two year warranties, but it won't do much good if they are not around!!)

HOW DO YOU PLAN TO MARKET THIS NEW SYSTEM?
We are planning to build a network of authorized Columbia dealers and are currently accepting applications from interested parties. We, as Columbia, are looking for organizations who are committed to providing a high level of on-site service and support, as well as an exceptional value, for end users.

I ASSUME THAT GODFATHER'S WILL BECOME YOUR FIRST DEALER?
Yes; but only in the local designated area for the Columbia AT-6000. Godfather's will NOT be selling the Columbia AT-6000 by national mail order but will be marketing ONLY through local authorized dealers. Godfather's currently has no way of meeting the requirements of providing national ON-SITE service and has decided, instead, to provide only excellent local retail service on the Columbia AT-6000. However, Godfather's IS offering a comparable product for our mail order customers . . . GODFATHER'S VIOLIN!!

WELL, I ASSUME THAT IT'S THE SAME PRODUCT, ISN'T IT?
You can assume anything you like, but I didn't say that, NOR WILL I!!! . . . and neither will you, if you know what's good for you!!!

ARE YOU PLANNING TO MARKET ANY OTHER PRODUCTS INITIALLY?
The new AT-6000 will be Columbia's only computer system at this time. We have had several requests to license the bios but aren't sure whether or not we want to share our high degree of compatibility with other manufacturers. We will be offering ROM upgrades and DOS 3.2 (or better) for existing owners of the older models, along with continued service and support for their machines. We also acquired a limited supply of several software packages, service manuals, and many odds and ends which will be sold by Godfather's.

FROM WHOM WILL EXISTING COLUMBIA OWNERS PURCHASE THE ROM & DOS UPGRADES?
Right now, all you SUPPOSED Columbia orphans can order directly from Godfather's. In the near future, we plan to form a national Columbia Owners' Association to help provide the existing owners with an economical source for upgrades and repairs. Through this Association, we will publish a periodic newsletter in which owners can exchange ideas and stay informed of new products available to them. For instance, we may have a way for existing users to speed up the Columbia and also a way to disable one of the internal serial ports so an internal modem can be installed in the 1600 model. This is just an example of some of the many ways that we can assure all those orphans out there that there IS a GODFATHER!!!

CAN PEOPLE JOIN THE OWNER'S ASSOCIATION AT THIS TIME?
While we have not yet completed all the details for the Association we do encourage anyone interested to write us. We have prepared a survey which allows prospective members to provide input on how the Association can best serve them. We will also be offering a discounted membership fee for charter members.

PLEASE CALL OR WRITE US & TELL US IF YOU WANT TO SEE MORE OF THIS TYPE AD!

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NEC HI-RES RGB JC 1411 P2A SUPER HI-RES *Will Not Work With 15.75 KZ Board* OUR PRICE $350 COMPARE AT $700 (RETAIL) or $440 (WHOLESALE)	NO	YES	NO	24.83 KZ	52 - 68 HZ	– Neg.	8	.31 MM	800 X 380	NO	14"
HITACHI RGB[illegible]M 1216 [illegible] Standard [illegible] OUR [illegible] $600 (RETAIL) [illegible] $350 (WHOLESALE)	NO	YES	YES	15.75 KZ	60 HZ	+ Pos.	16	—	640 X —	NO	12"

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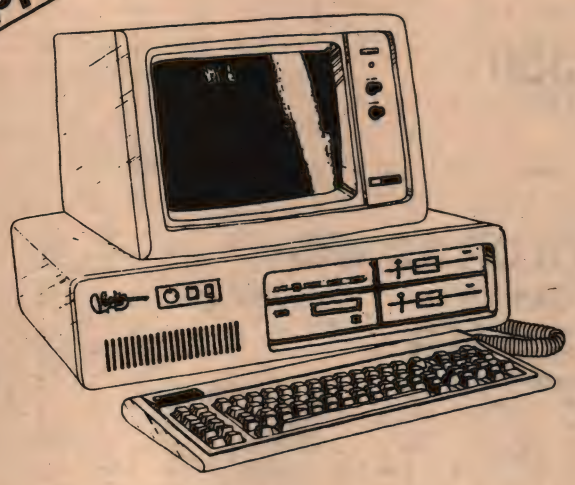

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From "C"
continued from page 120

than other methods for manipulating data. When addressing certain types of data, like the array and structure, pointers are generally the only method available to passing parameters into or out of the function.

Since a discussion of pointers is well beyond the scope of this article, let it suffice to say that using pointers offers incredibly powerful possibilites. While the use of a pointer is highly advisable, it is the abuse of pointers that results in the horror stories you've probably already heard. A runaway pointer is difficult to detect.

Conclusion

A professional programmer I recently spoke with made an interesting remark. When asked why he liked the C programming language so much, he replied, "It's because I like to break the rules!" Frankly, I suspect he was being totally truthful when he made that statement.

C places very few restrictions on the programmer. As a matter of fact, most C compilers will permit gross mistakes to go unnoticed during compilation. As a result, debugging C programs can be frustrating and time consuming.

There is a definite penalty to be paid for the liberal nature of the language; programmers lacking discipline in structured programming methods have the freedom to create programs totally unintelligible to another human being. Professionals tend to call this feature job security!

Since the best debugging tools available to the C programmer are generally symbolic debuggers (like Periscope, Atron, etc.), programmers lacking at least a minimal

continued on page 129

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Program Development continued from page 110

Another advantage is that I will have real data to use in testing processing and output routines. In addition, having the user debug part of the system while the rest is being written reduces the lag between programming completion and debugging completion. This reduces the lag between programming completion and payment. Finally, a long delay between writing a program and correcting it will increase the time it takes to make the corrections.

Step 8. Write the output routines. Having the actual data from the prior step saves me the trouble of entering fictitious data. At this point the user can still make format changes as well as report changes that do not require additional data without major impact.

Step 9. Write data editing and maintenance routines. This may include sorting or automatic processing of data files. Several technical hints to improve these routines:

Data editing routines can use most of the code from data entry routines. The only difference between the two is data field initialization. For data entry, the fields are blank while for data editing the fields contain an existing value. I use one common routine for both tasks. For data entry, the routine is called by an earlier routine that has initialized the fields to blanks or preset values. For data entry, the routine is called by an earlier routine which handled locating the particular record to edit and present the fields for its values.

It is common for a report to require some preprocessing first. Data must be sorted or a series of calculations performed. If this is not performed by the calling routine it is up to the programmer to make sure the user performs this task. I use one data file to store all of this type information for a system. For example, assume that a certain report requires sorted data. I would have a system statue data file with one record storing the status of the data file in question. When sorted, a Y would be stored to this status record. When any operation results in the data file no longer being sorted, the program would change the Y to an N. Any reports requiring sorted data could then check the status of the data file by checking its entry in the status file.

Step 10. Document the system. Even though most programmers hate documentation, the user needs two types. The first type is the user's documentation. This explains to a new user how to use the system. If the system is completely menu or command driven, this is a fairly easy task. I use Sidekick to capture a copy of each menu and data entry screen. The documentation is then simply explaining how to move around the system, how to enter and edit data, and how to generate the reports. I include installation in my fee so I do not include a section on installing the system.

The second type of documentation is programming documentation. I use a lot of remark statements in the actual programs. I also print out a copy of the programs and make detailed notes on them. I keep a copy and I provide a copy of them to the user. Of course this makes it easier for the user to hire someone else to modify the code later. While I may lose some business this way, I think the security it provides the user increases my chances of getting the job.

Step 11. Training the users. I include training in my system price. I do not do this to help the user, I do it to protect myself. I do not want someone downgrading my system because they do not understand how to use it. Providing the initial training myself prevents this. In addition, if you do a good job you might be asked back to train new users at an additional fee.

These steps can, and should, be modified to fit a particular application. However, closely following them will save you a lot of time in developing systems for other users. ●

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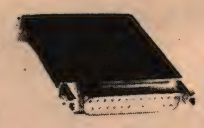
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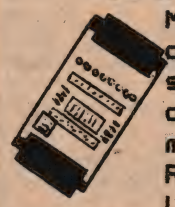
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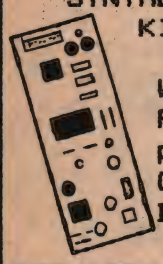
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From "C"
continued from page 127

background in assembly language programming would find debugging large C programs extremely tedious and time consuming.

C does have many advantages, and I would like to stress these over any objections. To begin with, it is probably the most portable language in existence today. Many new computer systems enjoy C as their only language.

C programs tend to be very compact and offer exceptional execution speed. In some cases, little improvement would be realized if the programs had been written in assembler as opposed to C.

C is one of the few languages besides assembler that permits the degree of control over the operating system and hardware that it does, although this aspect is much more evident on the mini and mainframe systems running Unix.

For developers and hobbist alike, C enjoys an incredible degree of support in the way of third party vendors. This enables you to purchase debugged and efficient algorithms rather than requiring you to go out and reinvent the wheel.

Many have great difficulty finding good books on the C language. I think I might be able to help you out a little. If you are interested in C, I suggest you purchase two books. The first is *The C Programming Language* by Brian W. Kernighan and Dennis M. Ritchie. This 200 plus page book is often referred to as the bible of C. While it's a little overpriced, it is THE C reference guide. After all, it was written by the guys that wrote the language!

Another exceptionally well written book on C is called *Complete C Language Programming for the IBM PC*. This $25 book, written by Douglas A. Troy and published by Little, Brown and Company, consists of over 500 pages of clear, concise explanations and examples of C programming in the PC environment. I highly recommend this one which should be available shortly at your local bookstores. ●

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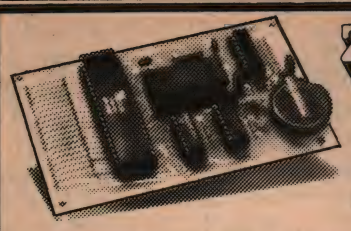

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Above systems include motherboard plus:

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Personal Typesetting

by Ronny Richardson

Personal Typesetting (PT) began life as a $69.00 standalone program from Potomac Pacific Engineering, Inc. When it did not sell well, they began including it in their public domain package. The entire package sells for $31.90. In addition to PT, the package includes:

One Hundred Business Letters
The Database of Steel
Flash Cards
A Spreadsheet
An Expert System
And More

PR requires and IBM-PC/XT/AT or compatible computer, 128K, and a letter quality printer. The printer must be capable of 1/120 inch horizontal movement and 1/48 inch vertical movement. Most letter quality impact printers meet these requirements.

PT takes an ASCII document and prints it on a letter quality printer using a proportional printwheel. A standard printwheel uses ½ inch for each letter. A proportional printwheel uses different space for each letter. So a capital C gets more room than a lower case i. Since "small" letters only get a small amount of space, the document takes up less space when printed. If you plan to make a lot of photocopies of the final document, this feature can save reproduction costs. Typically, this reduces the space required for a document by thirty to fifty percent. The proportional spacing makes the printed document look very much like a book. (See example paragraph printed with a standard printwheel and a proportional printwheel.)

You first create and perfect the document using an ASCII word processor. Once you have a ready to print document, the document is printed using PT. Since PT only prints the document, formatting the document is very difficult. You must print the document with PT. Then you use your word processor to embed PT print

continued on page 132

Hewlett-Packard continued from page 122

be reinstalled if desired any time.

Shared-System Resources

The DOS coprocessor system is designed to take advantage of shared-system resources wherever possible. The following components, for example, are shared between HP-UX and MS-DOS: keyboard, memory, displays, printers and plotters, file system and RS-232-C ports.

Shared-System Memory

The DOS coprocessor system uses existing Series 300 system memory for a more effective distribution of memory between MS-DOS and HP-UX. At the beginning of an emulation session, the user can select how much of the main-system memory should be allocated to the coprocessor.

When the coprocessor is not running, all memory purchased for the Series 300 can be utilized by the controlling operating system. The coprocessor software also has the ability to emulate the Lotus/Intel/Microsoft EMS (expanded memory specification) using standard shared-system memory. This extra memory (above 640 Kbytes) can be accessed as either expanded or extended memory.

The MS-DOS file system exists entirely within the HP-UX file system. A specialized drive letter, preset at D:, allows the MS-DOS user to tour the HP-UX file system completely using common DOS commands. This drive actually provides a window to the entire resident file system. Drive C: is configured to appear to DOS as an actual PC-AT 20-megabyte drive. Using this drive, applications that lock themselves to the resident hard drive are even compatible. To HP-UX, this MS-DOS drive appears as a standard file.

Software Emulates Peripherals And Video Resolutions

The software provided emulates popular video adaptors, including the standard monochrome-display adaptor, the color-graphics adaptor (CGA) and the Hercules graphics adaptor. These display resolutions are mapped onto a number of different Series 300 monitors offering multiple window sizes, gray scaling (with CGA emulation on monochrome monitors), and improved fonts.

Hercules graphics-adaptor emulation provides high-resolution monochrome-graphics support for popular MS-DOS software applications, such as 1-2-3 from Lotus, Symphony, Microsoft Word and Microsoft Chart.

IBM-Compatible Floppy Drive

In order to provide true off-the-shelf IBM PC-AT software compatibility, a 360-Kbyte, 5¼-inch, IBM-compatible floppy drive—the HP 9127A—is available. Providing DOS compatibility, the drive is able to read, write and format HP discs as well as provide compatibility to thousands of PC-AT MS-DOS software applications and data.

U.S. List Prices

Prices for the HP Series 300 DOS coprocessor are as follows:

Description	Part Number
HP Series 300 DOS coprocessor card	HP 98286A
HP Series 300 DOS coprocessor card	HP 98531A
HP Series 300 DOS coprocessor system (includes HP 98286A and 98531A)	HP 98286S
HP Series 300 DOS/Memory Enhancement Kit (includes 1 megabyte of RAM and HP 98286S)	HP 98286T
HP 360 Kbyte 5/14" IBM-compatible floppy	HP 9127A
HP numeric coprocessor (80287)	HP 45987A

For additional information contact Inquiries Manager, Hewlett-Packard Company, 1820 Embarcadero Road, Palo Alto, California 94303.

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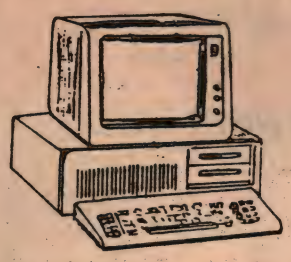

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Personal Typesetting
continued from page 130

codes to correct any problems. You then print again with PT to check the results. This is not too difficult with a short document. Plan several printing for a long document. Formatting takes longer because PT does not offer any control over windows and orphans.

PT comes with a manual on a disk. You print it out with Wordstar, not PT. The manual is poorly written and poorly formatted. It contains sixty two misspelled words! In addition to a poor manual, PT itself has some problems. Since the program is being distributed on a public domain disk set, it is not likely that Potomac Pacific Engineering will correct these problems.

The manual states that you must either prepare the document using Wordstar or add the control codes using Wordstar. In fact, you can use any word processor that will allow entering control codes (^B, ^E, ^W, and so on). Control codes are used for:

Changing letter spacing
Starting and stopping bold printing
Tabs
Stopping the printer to change printwheels
Starting and stopping underlining
Starting and stopping superscripts and subscripts
Starting and stopping overstriking
Color change

You can use all other print features with any word processor that can produce an ASCII document. If the word processor adds a return at the end of each line, each paragraph must be on a single line. I successfully used PC-Write, Edlin, and Copy Con:.

The manual states that the document must be right justified. A ragged right margin works as well. PT dot commands control the format of the printed right margin. Wordstar allows using PO as a space. This forces Wordstar to wordwrap using this space. PT does not recognize this as a space. Wordstar allows comment lines in a document. These lines start with two dots. PT uses this fact by having its dot commands start with two dots. When Wordstar prints the document, it ignores these comments. However, PT will print any comment lines in the document that are not PT commands.

PT used dot commands for formatting. These commands are very similar to Wordstar dot commands. They are entered using either one or two dots. Using two dots causes Wordstar to treat the dot command as a comment. Dot commands are used to:

Print a line right justified, ragged right margin, or centered
Set tabs stops
Set the page number
Omit the page number
Change letter, word, line, sentence and paragraph spacing
Control hyphenation.
Set margins
Set page size
Control superscript and subscript height
Page breaks

PT uses the tab stops with ^E and ^W to provide two tabs. Unfortunately, the tabs do not work consistently. There is a dot command to set the page number, but I was unable to get PT to print a page. With hyphenation on, the program will query the user as it is printing and about how to break words. PT asks about the same words each time it prints the document. A page break command [pa] is available, but PT does not sup-

continued on page 133

Both of these paragraphs were printed with a Qume Sprite 11/55 Plus printer. The same paragraph was used both times. It was written using Wordstar with a justified right margin at 36. The Wordstar version uses a standard printwheel while the Personal Typesetting version used a three inch margin.

Printed using Personal Typesetting

Both of these paragraphs were printed with a Qume Sprite 11/55 Plus printer. The same paragraph was used both times. It was written using Wordstar with a justified right margin at 36. The Wordstar version uses a standard printwheel while the Personal Typesetting version used a three inch margin.

Printed using Wordstar

Personal Typesetting continued from page 132

port a conditional page break. No widow or orphan is available.

PT causes the computer to lock when run using the Wordstar run a program option. This makes switching between Wordstar for formatting and PT or printing all the more difficult. PT occasionally skips blank lines without printing them. This only happens when using a dot command before a blank line. Moving the dot command to after the blank line corrects the problem. Finally, if the document is not on the same disk as PT, the program has one too few spaces for the drive letter, colon, eight character file name, period, and three character extension.

Formatting any document over three pages is difficult. Is it worth it? If someone will judge the final document on its appearance, then the answer is yes. If you compare the output to standard printer output, there is a big difference. It is like the difference between a cheap dot matrix printer and an impact printer. A resume, cover letter, term paper, or magazine submission would all be examples of documents where it would be worth while to format and print using PT. If your word processor can produce ASCII text and does not support proportional spacing, you should own this program.

For additional information contact Potomac Pacific Engineering, Inc., P.O. Box 2027, Gaithersburg, MD 20879; (301) 977-1489. •

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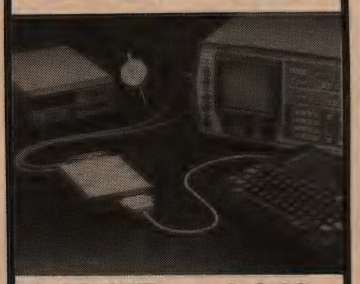

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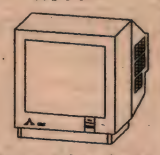

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Intel's New VLSI Graphics Coprocessor

Intel Corp. has introduced a high-performance, single-chip graphics coprocessor that can manipulate windows in hardware more than 100 times faster than can traditional software approaches.

Intel also announced that the new graphics chip is being supported by major independent software and hardware vendors, including MicroSoft Corp., Lotus Development Corp., Ashton-Tate and Digital Research Inc.

Intel's 82786 graphics coprocessor supports two independent, on-chip processors for manipulating graphics and text while executing multiple windows. The 82786 operates independently of the host central processing unit (CPU).

"The 82786 represents a dramatic leap forward in graphics capabilities that were formerly exclusive to expensive workstations and dedicated graphics subsystems," said Robert T. Jenkins, general manager of Intel's Microsystem Component Division.

"The 82786 executes its own instructions independently of the CPU, and integrates on one chip most of the functions traditionally found on workstation graphics boards. This speeds up graphics and display operations and, for the first time, brings affordable high-performance graphics to the office workstation."

Vendors endorsing the 82786 include Ashton-Tate, Digital Research Inc., Graphic Software Systems Inc., Lotus Development Corp., MicroSoft Corp., Nova Graphics International Corp., Number Nine Computer Corp., and Reuters Ltd. The companies are currently sampling the 82786 and are developing applications software, board products and development tools.

Designed to work with all Intel microprocessors, the 82786 is a high-performance replacement for subsystems and boards that use discrete components and software for implementing graphics functions. The 82786 requires minimal support circuitry for most system configurations, reducing the cost and board space requirements for high-performance graphics.

The 82786 uses the same advanced CHMOS-III (complementary high-performance metal-oxide semiconductor) process as the 80386 microprocessor. The graphics coprocessor has 130,000 transistors, combines high performance and low power consumption, operates at less than 1 watt, and supports up to 32 dynamic random-access memories in its dedicated graphics memory.

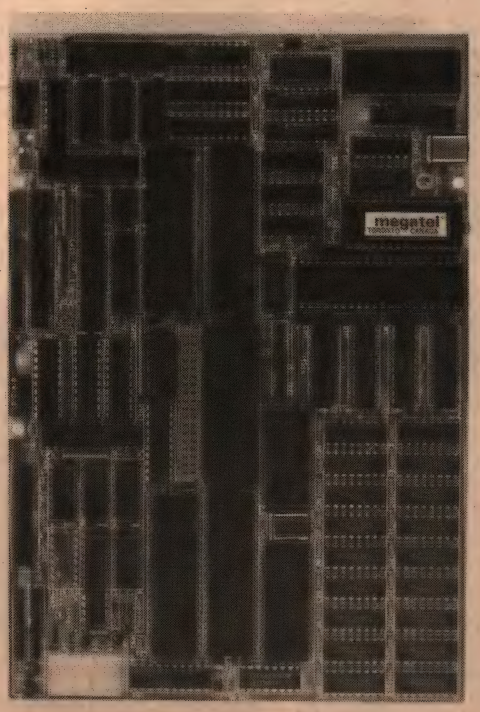
Coprocessor Architecture Offloads CPU

The 82786 has an on-chip graphics processor (GP) and display processor (DP), and operates concurrently with the system CPU. While the graphics processor (GP) executes commands from the host microprocessor and updates graphics and text in graphics or

continued on page 135

PC/XT Compatible Single Board Computer Mounts On A 5.25 Inch Drive

Once again Megatel has utilized PAL technology to its fullest by producing an XT compatible board which mounts on a 5.25 inch disk drive. The base board includes 256K Dram, 8088 CPU at 4.77 MHz, two serial ports, parallel printer port, floppy disk controller, color graphics CRT controller (it can be used with a monochrome composite monitor) and legal BIOS. Options include the XT compatible SCSI interface, real time clock, bus expansion module, bus expansion board, an additional 256K Dram and the 8088-1, 9.5 MHz speed-up mode. The base board combined with all these options, make the Quark/PC a formidable little product.



Megatel Quark/PC

The BIOS utilized by Megatel is a time tested bug free BIOS which boots PCDOS and will run Lotus 123 and Flight Simulator. The XT compatible SCSI interface the NCR 5380 SCSI interface chip. All other peripherals use the standard IBM chip set.

This Quark/PC offers the OEM or systems integrator several options in design to suit his application. Of particular interest is the 9.5 MHz mode which means no more speed limitations of the slower PC. The PC expansion module and board will also provide for easy expansion via the PC bus. Memory is no problem as there is the option of adding 256K.

List price for the base unit in single quantities is $495. Dealer and OEM discounts are available.

For additional information contact Megatel Computer Technologies, 150 Turbine Drive, Weston, Ontario, Canada M9L 2S2; (416) 745-7214.

Mention that you read about it in *Computer Shopper*. ●

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Intel's New VLSI continued from page 134

system memory, the display processor (DP) independently collects bits from graphics memory and displays the graphics and text.

Instructions to the display and graphics processors are placed in memory by the CPU. Registers on the 82786 point to the starting addresses of the first memory blocks of instructions controlling the on-chip processors, and each memory block points to subsequent blocks in a linked-list architecture. Through on-chip arbitration logic, the CPU and graphics coprocessor can work independently with system memory and graphics memory, and share information as needed. Separate on-chip circuitry can be programmed to provide the video signals to drive a variety of display hardware.

Twin Processors for Hardware Window Execution

The graphics processor manipulates graphics and text through bit maps—rectangular drawing areas that serve as the canvas for a set of graphics operations, such as line drawing, color filling or polygon creation. The graphics processor manipulates several bit maps, regardless of their actual display.

The display processor takes the appropriate data from each bit map for display on the screen with a feature called "hardware windows." Users merely change pointers to the bit maps to automatically change the size, shape or information content of a window. The display processor can also drive cathode-ray tubes (CRTs), liquid-crystal displays (LCDs) and laser printers.

To support the memory required by individual bit maps, the 82786 uses a linear, 4-megabyte graphics memory. Within this memory, bit maps can range up to 32,000 pixels on a side, with individual pixel depth (bits/pixel) ranging from 1 to 8 bits of color or gray scale. Additionally, address space can be mapped into graphics and system memory.

Standards Support

The graphics processor's instruction set closely follows the American National Standards Institute (ANSI) Computer Graphics Interface (CGI), and provides programmers with a flexible programming interface for complete control of the contents of bit maps. CGI allows software vendors and original-equipment manufacturers to minimize the number

continued on page 138

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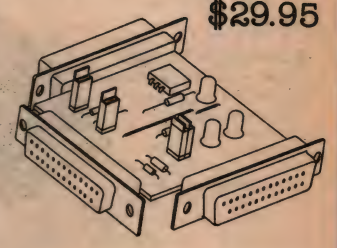

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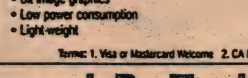

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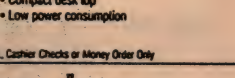

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WYSE's New PC AT-Compatible System

WYSE AT-Compatible

Wyse Technology announced that it has added several new IBM personal computer-compatible products to its computer products line, including an IBM PC AT-compatible computer, three monitors and two graphics display adapter boards.

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Wyse also introduced its WY-530 monochrome, WY-630 color and WY-640 Enhanced Graphics Adapter (EGA)-compatible displays. The WY-530 and WY-630 replace earlier models. The WY-640 brings additional high-end color capabilities to the Wyse monitor line.

As part of its emphasis on extending display capabilities, Wyse has introduced two graphics display adapter boards, the WY-430 graphics display adapter and the WY-440 EGA-compatible display adapter.

The WYSEpc 286 Microcomputer

The WYSEpc 286 offers a

continued on page 141

Micromint Offers Turnkey Bulletin Board System

Based on a high speed microcomputer and an integral 300/1200 baud modem, the TKBBS comes with sophisticated, easy to use software that allows one to set up and maintain a flexible and powerful remote access bulletin board. The TKBBS is easily configured to provide a public bulletin area, and it also handles general and private mail. The system offers log-on routines and password protection for directories, which may be implemented or disabled by the operator. All functions are menu driven and supported by on-line help.

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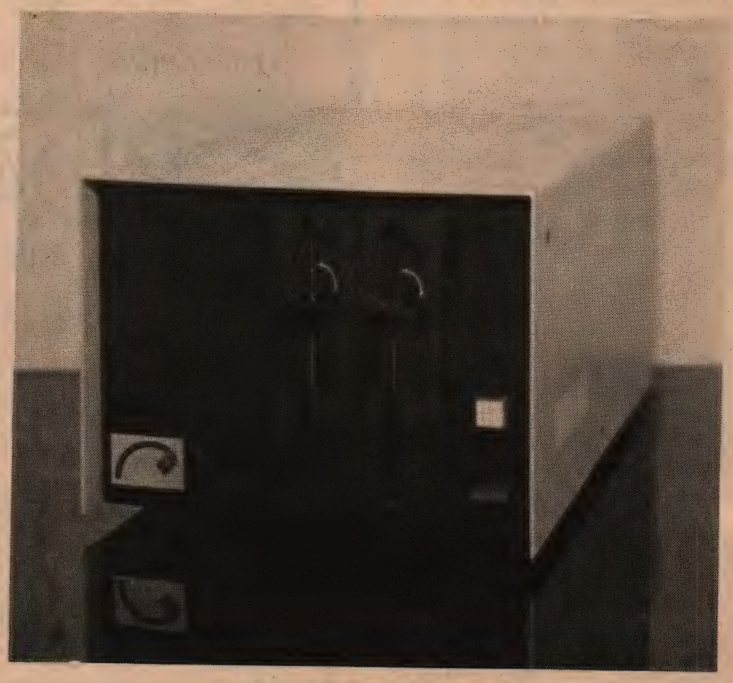

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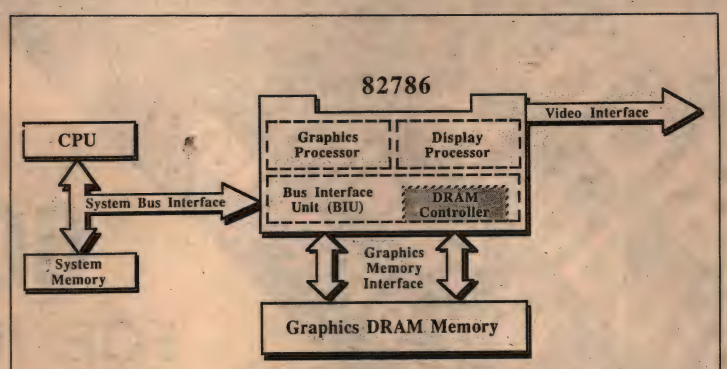
Intel's New VLSI continued from page 135

of rewrites required for additional board and software support.

Advantages Of A Graphics Coprocessor

Personal computers typically produce graphics by commanding the CPU to read and execute instructions from software. The CPU begins to execute these software instructions by modifying registers in a separate video memory. It continues this process—reading instructions from software, executing them, modifying registers in video memory—until all graphics instructions are read and executed.

This process requires numerous machine cycles and direct intervention by the CPU. If it is reading instructions from software, executing them, modifying registers or commanding the CRT controller, the CPU cannot handle other tasks. This process creates a system bottleneck that severely limits the performance of a multitasking personal computer, such as the IBM PC AT, which decreases user productivity.



Architecture of Intel's 82786 Graphics Coprocessor

But the ability to handle graphics tasks from hardware frees the CPU for other processing and speeds up the overall process. Intel's 82786 graphics coprocessor accomplishes this through VLSI, which places an entire graphics subsystem on one chip.

The 82786 has two on-chip processors that operate concurrently—a graphics processor and a display processor—as well as a bus interface unit and a DRAM controller.

The CPU plays a limited role when an 82786-based system requires graphics output. Typically, the CPU places instructions for specific graphics output into the coprocessor's graphics memory. The on-board graphics processor gathers these instructions directly from graphics memory, then executes those instructions. The CPU returns to its other tasks, while the graphics processor continues executing commands and updating graphics and text in its dedicated graphics memory. The second processor on the 82786—the display processor—then independently collects bits from this same memory and displays them.

The ability of the 82786 to operate virtually independently is of tremendous value in multitasking and window environments, such as Windows and Top View, that require pixel-intensive operations. By offloading all graphics operations to the 82786, the CPU becomes highly efficient, focusing on the applications and the needs of the operating system.

An 82786-based multitasking personal computer can instantly alter the screen display for scrolling, panning and new windows without having to continually redraw the contents from graphics memory. This is possible because each application can have its text and graphic output drawn into separate regions of memory, and each can be instantly displayed on screen by simply relaying the data to the screen.

For example, the graphics processor on the 82786 could update bit maps for different tasks, while the display processor draws only those of most interest to the user. A foreground task such as a spreadsheet could appear on the screen, while electronic mail graphics could be updated in the background, to be shown only at the user's request. In this case, the switch between displayed windows would occur nearly instantaneously because the graphics information would be already

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Intel's New VLSI continued from page 138

available in memory. The 82786 coprocessor's independent operation permits these activities to occur without degrading the CPU's ability to execute application programs.

The graphics processor handles graphics and text through bit maps—rectangular drawing areas, each comprising a number of pixels. A bit map serves as the canvas for a set of graphics operations, such as line drawing, color filling or polygon creation. The graphics processor manipulates several individual bit maps independently of their actual display.

Using an internal shift register, the display processor can assemble several windows on the screen from different bit maps in graphics memory, and even zoom in on windows horizontally, vertically or both. The system can perform rapid display changes with minimum overhead because window movement and display tasks merely require the CPU to point to instruction lists in memory rather than create entire lists.

Integrated Design

The highly integrated design of the 82786 eliminates the need for the separate components normally found on a graphics board. Almost all of the discrete logic is included on the chip. This high integration reduces system cost because fewer parts and less space are required to achieve the same functions. It also increases reliability because fewer parts mean less chance of malfunction. And in most cases, only a few chips are needed to interface directly to an 80286 microprocessor.

The CPU and graphics coprocessor can work independently with system and graphics memory as well as share information through on-chip arbitration logic. Separate on-chip circuitry can be programmed to provide the video signals that drive a variety of display hardware.

The 82786 has access to 4 megabytes of memory address space divided between external system memory and 82786-supported graphics memory. This provides the 82786 with high-speed access to graphics information without competing with the CPU for system memory. The dedicated memory holds display data, character fonts and programmed instructions for use by the chip's internal processors.

In addition, the 82786 coprocessor contains a complete DRAM controller that acts as a direct interface with a variety of DRAMs without external logic. Besides reducing chip count, this approach permits the chip to communicate with DRAMs in high-speed bursts as fast as 40 megabytes per second.

Intel's graphics coprocessor can support 640 by 480 pixel resolution displays with standard DRAM memories. It can provide up to 256 simultaneous colors or gray scales for text and graphs, and on monochrome systems can support 1800 by 1350 pixel resolution with standard DRAMs. With video DRAMs, it can provide virtually unlimited color support and resolution.

The 82786 is fabricated with the same advanced CHMOS-III (complementary high-performance metal-oxide semiconductor) process as the 80386 microprocessor, combining high performance and low power consumption. It operates with less than 1 watt. The device's 16-bit architecture is designed to be used with 8-, 16- or 32-bit microprocessors.

Laser Printers

Just as the 82786 displays bit-map memory on a computer screen, it will display bit-map memory on a laser printer. The 82786 controls the laser beam, instructing it to be on or off, depending on the codes received from the computer, and constructing bit-maps via the on-board graphics processor. The 82786 will perform far better than the general processors currently used in laser printers.

The 82786 can support up to 30 pages per minute for legal-size pages, with resolutions of 300 dots per inch, and supports multiple character sets at one time with proportional spacing. The coprocessor also supports low-cost DRAMs and communications with the printer engine with little or nc extra logic. ●

WYSE's New continued from page 136

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Display options for the WYSEpc 286 range from medium-resolution monochrome and color graphics monitors to high-resolution enhanced graphics in either

continued on page 141

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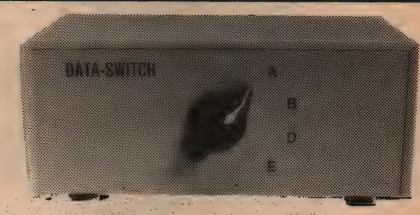

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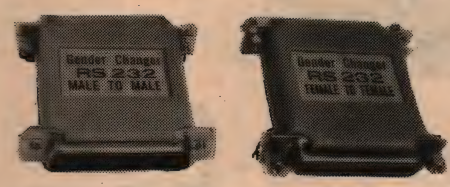

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Digital Research Announces Concurrent PC DOS Expanded Memory

Concurrent PC DOS Expanded Memory (XM)—the powerful new operating system from Digital Research which supports expanded memory, multitasking and runs existing PC DOS, MS—DOS, Concurrent DOS and CP/M 86 applications without modification—will be released in July, President John Rowley announced recently.

The new Digital Research operating system has the ability to utilize the AST/Quadram/Ashton-Tate Enhanced Expanded Memory Specification (AQA EEMS) to run multiple DOS sessions concurrently. At the same time, the system fully supports the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS) to run new expanded memory applications.

Market Trends

Concurrent PC DOS Expanded Memory responds to four primary market requirements of sophisticated PC users which Rowley defined as 1) the desire to improve productivity through multitasking; 2) the need to work with spreadsheets and databases larger than the IBM PC 640K limit allows; 3) the need for bit-mapped graphics support within an operating environment; and 4) the requirement for PC DOS applications support.

"With the expanded memory of Concurrent PC DOS Expanded Memory, the 640K barrier imposed by PC DOS has been broken," said Rowley. "The clear need in operating systems for the past 18 months has been adequate memory to run multiple programs. Concurrent PC DOS has had the necessary multitasking and multiuser capabilities to meet this need, and now the new Concurrent PC DOS Expanded Memory provides access to the required memory."

"IBM's direction toward future 80286 protected mode operating system-based products opens the door for a vast improvement in operating system support for current and future purchasers of 8086 and 80286 real-mode PCs," stated Michael Loftus, Product Marketing Director at Digital Research. "Concurrent PC DOS Expanded Memory was designed specifically to fill the technology gap created by the maturing use of 8086 and real mode 80286 based PCs versus the future generation of protected mode 80286 based systems."

Distribution

The new operating system will be distributed to OEMs, board manufacturers, Value Added Resellers (VARs) and end users through DRI's worldwide sales channels, Loftus explained. Concurrent DOS 86 Expanded Memory will be licensed to Original Equipment Manufacturers and Concurrent PC DOS Expanded Memory will be available to VARs and end users through retail channels. The two products are the first in a series of Digital Research systems software environments using expanded memory.

The implementation of expanded memory is portable in order to accommodate the needs of current OEMs as well as to provide for smooth transition to an IBM standard for expanded memory should one emerge in the future.

Concurrent PC DOS Expanded Memory was implemented with more than 87 currently active Digital Research OEMs in mind. The design allows manufacturers to either implement expanded memory capabilities in proprietary designs or to follow

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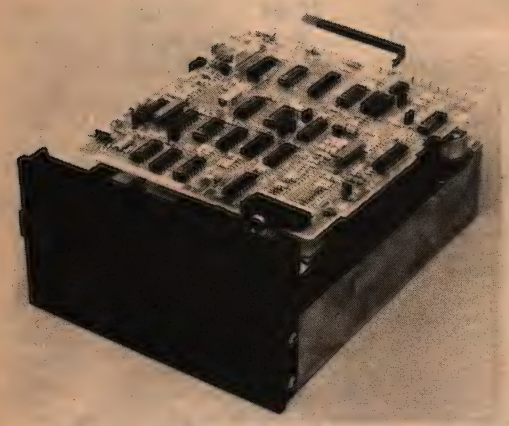

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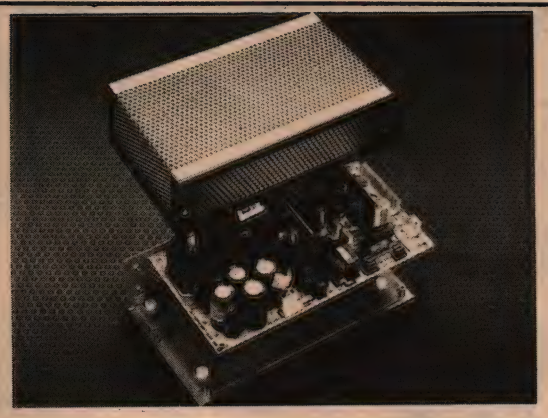

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WYSE's New
continued from page 139

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The WYSEpc 286 is styled to present a compact, attractive package that matches other Wyse display products. Specific styling details include front-panel controls, a protective door to guard the floppy disk drives, and an optional floor stand to save desk space.

The WYSEpc 286 combined with Wyse monitor products serves a variety of markets. With the WY-700 high-resolution monitor and graphics board sub-system, for example, the WYSEpc 286 can run high-resolution computer-aided design and engineering (CAD/-CAE) applications, as well as standard IBM PC AT software. Further, the WYSEpc 286 matched with PCAT-compatible WY-60 terminals can operate as a multiuser system.

The WYSEpc 286 can be configured with a 1.2 megabyte, half-height, single floppy disk drive; a 20 megabyte, half-height hard disk drive, and a 40 megabyte, full-height hard disk drive. Standard features include 640 kilobytes of random-access memory, eight full-size PC AT expansion slots, a real-time clock with battery backup and both an RS-232 serial port and a parallel port.

The WY-530, WY-630 and WY-640 Monitors

Wyse's new monitors are IBM PC-compatible 14 inch displays. The WY-530 monochrome monitor offers high-contrast etched glass for reduced glare. The WY-630 color monitor features a 16 color palette and the ability to switch easily from color mode to either amber or green for text-only applications. The WY-640 has all of the features of the WY-630 with increased resolution and an etched screen. It operates with the Wyse WY-440 Enhanced Graphics Adapter and other IBM-compatible EGA boards.

The WY-430 and WY-440 Display Adapter Boards

The WY-430 display adapter provides the functions of a monochrome text adapter, a monochrome graphics adapter and a color graphics adapter on one board. The WY-440 offers IBM EGA compatibility for software and monitors.

Price and Availability

The WYSEpc 286 model 2200-01 with a 1.2 megabyte, single floppy drive has a suggested list price of $2,499. The 20 megabyte hard disk model 2200-20 sells for $2,999, and the 40 megabyte model 2200-40 is priced at $4,199.

The WY-530, WY-630 and WY-640 monitors are list priced at $235, $599 and $749, respectively, and the WY-430 and WY-440 display adapter boards sell for $299 and $499. All are available now.

For more information contact WYSE Technology, 3571 N. First St., San Jose, CA 95134; 408-433-1000.

Mention that you read about it in *Computer Shopper*. ●

Digital Research
continued from page 140

the published AQA EEMS or LIM EMS specifications and use Concurrent PC DOS Expanded Memory as provided by Digital Research.

Digital Research has also targeted Concurrent PC DOS Expanded Memory for use by VARs with complex programs consisting of multiple tasks and/or system integrators developing customized applications or complete solutions, including real time systems. "The combination of this operating system with a memory expansion board enables software developers to write larger and more sophisticated applications," Loftus said. "Developers of multitasking and multiuser mini-computer packages will be able to port them to micros and reach entirely new markets."

Loftus said that the new operating system will be

continued on page 142

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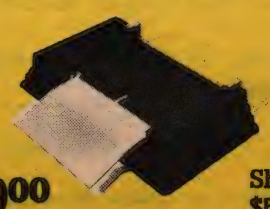

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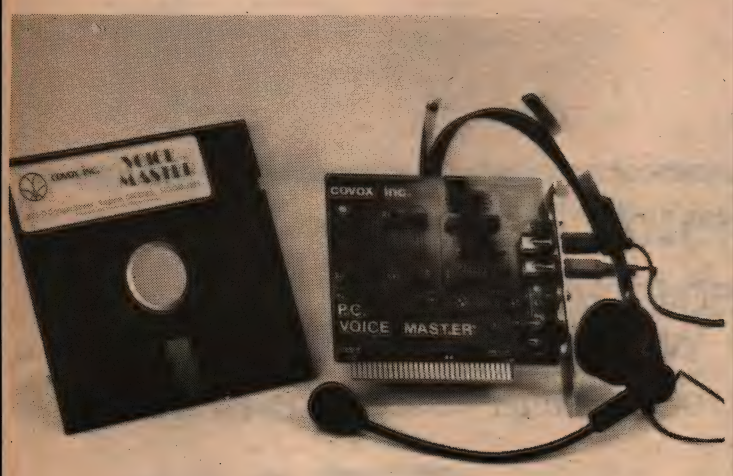

Dr. J. L. Stewart, Ph.D., president and C.E.O. of Covox, Incorporated, formally announced the release of a multi-featured Voice Master voice recognition system for the popular IBM-PC, XT, AT and compatible personal computers. Dr. Stewart projects shipment of the product in the fourth quarter of 1986 at a suggested retail price of $129.95 which includes the half-card circuit board, microphone headset and resident system software.

Versions of Voice Master are currently available for Commodore, Apple II Series and Atari 8-bit microcomputers.

For additional information contact Covox, Inc., 675-D Conger Street, Eugene, OR 97402; (503) 342-1271.

Mention that you read about it in *Computer Shopper*. ●

Digital Research continued from page 141

marketed aggressively through traditional PC retail channels. "Previous Concurrent PC DOS releases have been very popular with corporate PC users, and with the expanded memory support for Lotus 1,2,3 and Ashton-Tate's Framework II, we anticipate even stronger corporate demand for this product," stated Loftus. "Concurrent PC DOS Expanded Memory assures our large corporate users compatibility with today's boards as well as a migration path to future standards from IBM."

Concurrent PC DOS Expanded Memory will be released simultaneously in the United States and Europe. "To date, more than 250,000 shipments of Concurrent DOS have been made worldwide. Significantly greater demand for the new product is expected because of market timing, customer need and the lack of substantial operating system competition, indicated Rowley.

Features of Concurrent PC DOS XM

Concurrent PC DOS Expanded Memory supports and takes advantage of all attributes of the LIM EMS. In addition, Concurrent DOS Expanded Memory supports the AQA EEMS which gives users all the advantages of EMS plus the capacity to have multiple DOS sessions in expanded memory.

Popular applications such as Lotus 1,2,3, the dBASE series and Wordstar family can be run with Concurrent PC DOS Expanded Memory as can the wide base of programs designed for Concurrent DOS 86. Users can perform multiple tasks, switching screens to display background tasks or displaying background tasks in multiple windows. Because the expanded memory of Concurrent PC DOS Expanded Memory can support more users—up to three are possible—the system provides a low-cost alternative for multi-user computing which can later be networked.

Extensive graphics capabilities and a wide range of graphics applications are available to users of Concurrent PC DOS Expanded Memory by providing full GEM (Graphics Environment Manager) support, including Digital Research's GEM Business Applications.

Concurrent PC DOS Expanded Memory comes complete with a configurable memory system, menu driven file manager, an integrated online HELP, and a full set of accessory products including a name and address filer, text editor and print spooling program.

Price, Requirements

Concurrent PC DOS Expanded Memory is available from major retail outlets at a suggested list price of $395. Volume discounts and site licensing are also available from Digital Research on request. For a smooth transition, current registered end users of Concurrent PC DOS may acquire an upgrade program for a nominal fee by calling (800) 442-4300.

Concurrent PC DOS Expanded Memory will run on the IBM PC, PC/XT, AT and 100 percent compatible computers. Conventional memory required is 512K. Computers with expanded memory will need 256K of conventional memory. A hard disk is recommended for increased performance and ease of use.

For more information contact: Digital Research Inc., 60 Garden Court, Monterey, CA 93942; (408) 646-6218.

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HARD DISK SOFTWARE 3

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VISUAL QUALITY 6

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MCS To Demonstrate Voice-Actuated CADD System

"No hands" mechanical design and drafting has become a reality with the addition of voice-recognition capability to ANVIL-1000MD computer-aided design and drafting (CADD) software from Manufacturing and Consulting Services Inc. (MCS) of Irvine, California.

The voice-actuated CADD system, developed in conjunction with Kurzweil Applied Intelligence of Waltham, Massachusetts, will be demonstrated through May 15 in booth 1688 at the Computer Graphics '86 Conference and Exposition at the Anaheim Convention Center.

The voice-recognition system preserves all the capabilites of ANVIL-1000MD. Without touching a keyboard, without touching a tablet or joystick, the designer can create a complete design on his PC workstation. By talking into a microphone, he can add dimensions and annotations. He can zoom in to a small detail, change the drawing, and zoom out to check his work. He can call up a part or change levels or colors, all without touching the keyboard.

"Obviously, a voice-actuated CADD system opens the field of mechanical design and drafting to people who, for whatever reason, have impaired ability to use their hands," said Dr. Patrick J. Henratty, president and founder of MCS, "but it's more than just a tool for the physically challenged; it's also useful for people whose hands are otherwise occupied. In fact, it's a new way to operate a CADD system, and we're just beginning to explore its potential."

The leader of the team that developed the voice-actuated ANVIL-1000MD system is Brian J. Hanratty, director of professional CADD/CAM systems development.

"One of the things that sets us apart is our dedication to research. In a sense, MCS is like a university in what we do basic research—seeking knowledge for its own sake—as well as product-development research," Brian said.

For additional information contact Manufacturing and Consulting Services, Inc., 9500 Toledo Way, Irvine, CA 92718; (714) 951-8858.

Mention that you read about it in *Computer Shopper*. ●

G.O. Announces What's Best! Personal Version

General Optimization, Inc., has announced a new version of What'sBest!, the spreadsheet optimization program. The new What'sBest! Personal Version sells for $149, offering inexpensive entry-level access to this exciting new software technology.

The What'sBest! Personal Version has identical functionality to the larger What'sBest! versions with two exceptions. First, it is not copy-protected. Second, the Personal Version, which runs in 256K of RAM, can optimize spreadsheets with up to 800 numeric cells. Up to 250 of these cells can be "variable," that is, can be manipulated by What'sBest! during the optimization process. This allows solution of a great variety of real world problems on a minimally configured IBM PC or compatible.

General Optimization also announced the upgrading of its Commercial Version. Selling for $695, the Commercial Version now supports models with up to 3000 numeric and 1500 variable cells. Its 400K memory requirement leaves ample space for compatible memory-resident software on a 512K machine.

The $995 Professional Version, requiring a full 640K of RAM, supports large-scale problems with as many as 8000 numeric and 4000 variable cells.

New Upgrade Policy Also Unveiled

The company also announced a new Upgrade Policy to protect customers' What'sBest! investment. Any What'sBest! buyer can receive full credit, less a $25 handling charge, towards larger product versions of the same release. In addition, upgrades from What'sBest! Release 1.0 to the new Release 1.1—which features new support for Symphony 1.1 and Lotus 2.0—are available without cost.

Mike Campbell, General Optimization's vice-president of marketing and sales, provided background on the new pricing and upgrade policies.

"We expect that once developers, consultants, and end-users have worked with the Personal Version on smaller problems, they will see how to apply What'sBest! to the full range of optimizable problems throughout their businesses. As they optimize larger and larger problems, especially in such areas as manpower scheduling and corporate-level analysis, they will discover that the higher price of our larger versions is insignificant compared to the savings they create."

Campbell's latter assertion is supported by the case of Grant Hospital of Chicago, which is projecting annual savings of nearly $1.4 million using a What'sBest! staff scheduling system to minimize nursing payroll. The hospital has reordered multiple copies of the program.

For additional information contact General Optimization, Inc., 2251 North Geneva Terrace, Chicago, Illinois 60614; (312) 248-7300.

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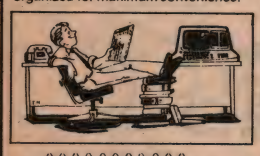

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MC-6502	6502 (65XX)
MC-8085	8080 & 8085
MC-8048	8048 Family
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DigiBoard Introduces New Multi-Channel Communications Board

A new generation of DigiCom advanced multi-channel communications boards for the personal computer has been announced by DigiBoard, Inc. The next-generation boards have been introduced to the OEM, VAR/VAD and systems integrator market.

DigiCom boards work with all leading multi-user operating systems, in addition to expanding the capabilities of MS-DOS. The product line includes four- and eight-asynchronous port models for linking multiple users on IBM PC, XT, PC/AT or compatible units.

Both improved DigiCom board models will be upgraded to provide for easier and more flexible applications within multi-channel communications environments. According to DigiBoard president John Schinas, the improved models will expand capabilities available with earlier boards, while retaining the pertinent features.

The improved board design will offer increased flexibility by allowing the use of both IBM-standard and non-standard interrupt structures, providing for use with a wider array of peripheral devices and systems. And the on-board status register has been modified to allow easier polling.

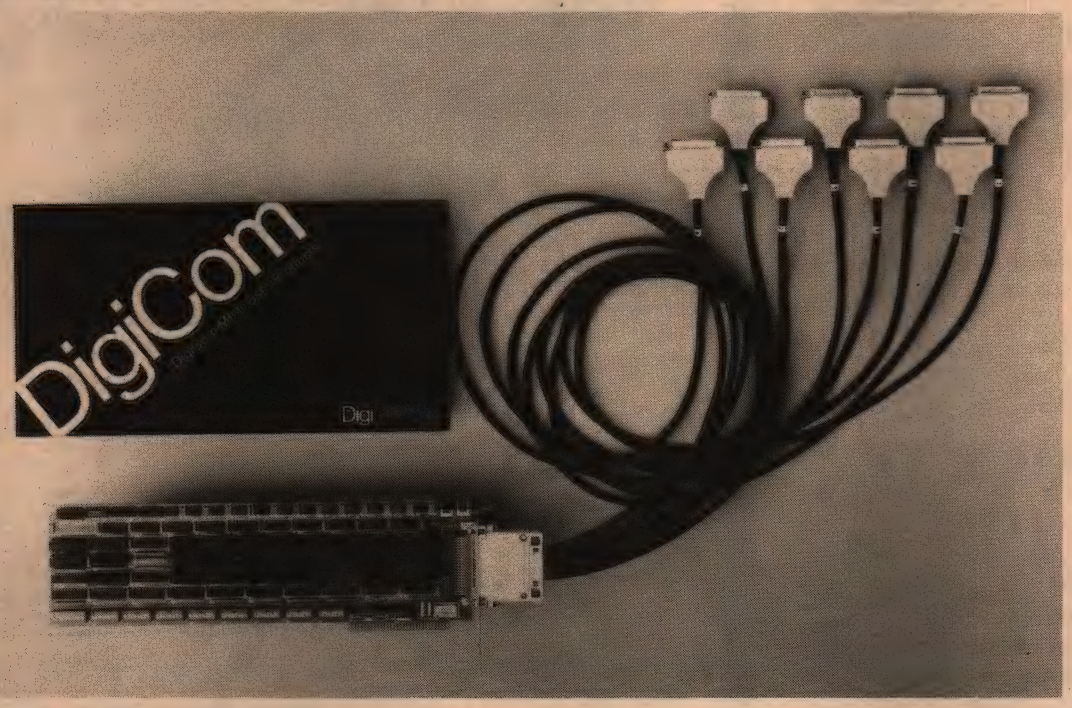
The new DigiCom line will also feature a redesigned cable attachment with a unique shielded, one-piece modeled connection that reduces RF leakage and is easier to install and maintain. The redesign provides for easier multi-channel expansion and connection.

An improved board layout utilizing new fine-line design techniques has been incorporated into the DigiCom board redesign, Schinas said. "The redesign will increase the overall functionality of our boards, and even further reduce potential for board failure in the field." DigiCom boards have an extremely low field failure rate since the product line was introduced in 1984.

"Our major goal in developing new and better multi-channel boards is to provide the best support possible to integrators in the field," Schinas said. "We do that with next-generation products and DigiTeam support, to help them be more flexible and responsive as today's sophisticated multi-user environment requires."

DigiCom boards are highly versatile multi-channel boards for use with the IBM PC, XT, PC/AT and most compatibles as well as most multi-user operating systems including Xenix, QNX, PICK, THEOS, Venix, Multi-Link, and other Unix and non-Unix based systems. A DOS interface is provided, to allow DOS to access up to 33 communications port using DigiCom boards. DigiCom products provide maximum flexibility for system users, with dedicated 8250 UARTS which can be set to any interrupt, baud rate and address.

For additional information contact DigiBoard Inc., 6751 Oxford Street, St. Louis Park, MN 55426; (612) 922-8055 or (800) DIGIBRD. ●



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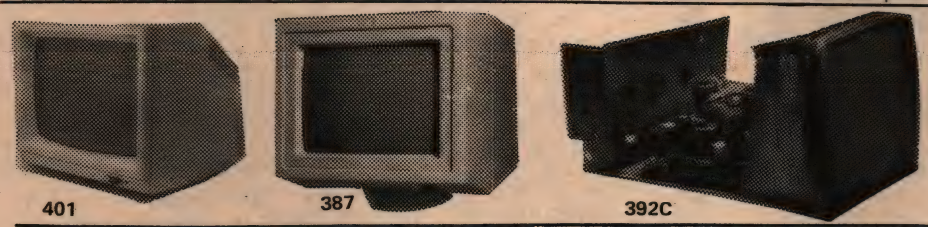

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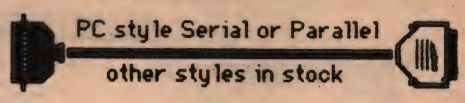

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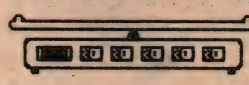

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Expanded Memory, Graphics Display And Multi-Functions On Single Card

Tim Farris, president of Boca Research, announced that the first MEMEK add-on boards have been shipped. "No other product we have seen offers users as many features on a single add-on card as MEMEK," explains Farris. "We designed MEMEK to be exactly what it is—integrated."

MEMEK brings together all of the features of the most popular PC add-on products, including clock/calendar and fully addressable multi-function ports and adds them to an expanded memory board with up to 2 Meg of RAM, conforming to the Lotus/Intel/Microsoft Expanded Memory Specification (EMS 3.1). According to Farris, MEMEK is made possible only with the use of a proprietary VLSI chip set that his development team created over the past 16 months. Gate array technology was used to emulate the most popular video display options including IBM monochrome (MDA), IBM color graphics (CGA), Hercules Graphics (monochrome graphics), and Plantronics ColorPlus (extended color graphics).

Farris points out that it is not likely that MEMEK will have to compete with "look-alike" products in the near future. He says that the development cost of an integrated chip set like the one his team has created is too costly to duplicate. "Even larger companies find it difficult to focus a development-teams' efforts on a project long enough to produce a VLSI chip set like ours." Farris should know, he was the founder of Quadram Corporation before his early retirement brought him to Boca Raton and the founding of his new company...Boca Research.

MEMEK was designed to be a cost effective alternative to purchasing a variety of add-on products for a user's PC, but Farris says that he is experiencing a ground swell of interest from VARs and System Integrators. "These people are under a lot of pressure to put together reliable systems that offer high performance at a low price."

While MEMEK offers both price and performance, there is more. The high degree of integration and use of VLSI technology reduces power consumption and improves product reliability.

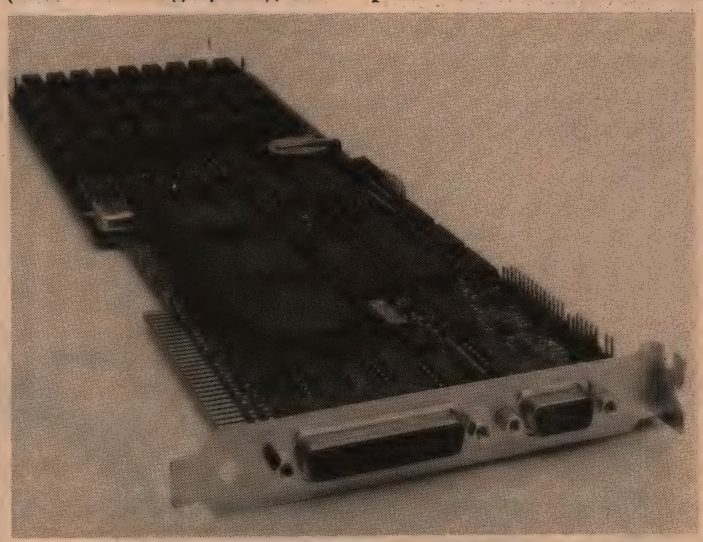
Because MEMEK was intended to be an integrated system from the beginning—it offers a number of features that may not be found in products offering less integration. VARs, software developers, and System Integrators are interested in MEMEK's high resolution color graphics display. Similar to Tecmar's Graphics Master, MEMEK displays up to 16 colors simultaneously with 640 x 400 resolution on standard color monitors.

MEMEK is the only EMS product that allows full control over the allocation of memory between video, system, and expanded memory. MEMEK can co-reside with other memory products allowing the creation of a RAM disk up to 8 Megabytes in size. MEMEK's video memory may be expanded up to 2 Meg and used as a video buffer containing up to 64 pages of video display. Video memory may be sequentially displayed in rapid succession for animation and other purposes.

Unlike most display and memory products, MEMEK does not require the user to set DIP switches or adjust cumbersome board jumpers. MEMEK installation software is self-booting and will operate even though neither memory nor monitor specifications have been set. System specifications are set with the help of a menu driven screen and saved on the board in an electrically erasable EEPROM memory chip. As a result the system is automatically configured each time the system is booted.

For additional information contact Boca Research, Inc., 6401 Congress Avenue, Boca Raton, FL 33431; (305) 997-6227.

Mention that you read about it in *Computer Shopper*. ●



CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS

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RAMS - ADDED MEMORY

4164-15	UP GRADE	$1.15	2708	$2.80	2764	$3.25
4164-20	UP GRADE	$1.05	2716	$3.50	27128	$4.00
41256-15	UP GRADE	$2.75	2732	$3.95	27256	$6.00
4128-15	FOR AT (PIGGY BACKS)	$4.75				

EPROMS

IBM PC/XT or CLONE
(USED ON 4.77 MHZ MOTHERBOARD)

8284	$4.35	8255-5	$3.50
8088	$4.95	8259-5	$5.50
8288	$6.75	8237-5	$6.75
8253-5	$3.50	765	$7.00

KIT = 1 EA OF ABOVE **$29.95**

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FLOPPY DISK CONTROLLERS

R6765P-5 (Rockwell)	Handles 5-¼"	$6.00
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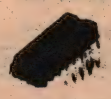
MATH COPROCESSORS
SPEED UP YOUR MATH PROCESSING
UP TO 300%

8087	(5 MHZ)	FOR PC/XT	$125.00
8087-2	(8 MHZ)	FOR PC/XT	$150.00
80287-3	(6 MHZ)	FOR AT	$185.00
80287-8	(8 MHZ)	FOR AT	$325.00

REPLACEMENT FOR 8088/8086
SPEED UP YOUR COMPUTER
WITH:

V20	(5 MHZ)	(8088)	$15.00
V20	(8 MHZ)	(8088)	$19.00
V30	(8 MHZ)	(8086)	$19.00

These chips replace the controller chip. All functions speed up 10 - 40%.



MONITORS

RGBi COLOR MONITOR - THOMSON

- 14 inch RGB color monitor
- 0.43/0.38 mm dot pitch for 640-pixel resolution
- sharp text and vivid color graphics
- front text switch gives option color - green - amber
- cable included

Model CM36432 ..... **$425.00**

25 lbs.

MONITOR STAND

TILTS AND SWIVELS

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5 lbs.

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We accept checks, VISA, Mastercard. Purchase orders from qualified firms and institutions. U.S. funds ONLY. California residents MUST add 6.5% tax. C.O.D. add $1.90. Shipping is UPS. Add $2.00 for ground — $5.00 for air up to 5 lbs. Call for over 5 lbs. All major manufacturers. All parts are 100% guaranteed. Pricing subject to change without notice. $10.00 minimum order.

CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS CHIPS

Samna, AT&T Develop Write Power

Samna Corporation recently announced a joint development project with AT&T Information Systems, culminating in two new office automation software products—Write Power 1 and Write Power 2.

Write Power 1 is a word processing software package that offers all the basics of word processing—underline, bold, center, justify, delete, copy, math calculations, etc.—as well as advanced features like DIF, ASCII, and IBM/DCA (Document Content Architecture) file translation, mail merge, a special pop-up telephone message window, a special feature to create and store forms, the ability to use the new AT&T Model 7500S Electronic Typewriter as an input/output device (eliminating the need for an additional printer), and more.

Write Power 2 is an office automation software package that includes all the word processing capabilities of Write Power 1, plus an integrated spreadsheet and WordBase Manager that searches through all files on a disk to locate any word or group of words and report the file that contains them, as well as the page number and line number.

Both products work with MS-DOS operating systems that drive AT&T personal computers.

According to Samna senior vice president Thomas J. Anderson, "AT&T Information Systems chose Samna to provide the software component of its office automation workstation because of Samna's expertise in developing business applications software. AT&T has used Samna products for several years, particularly AT&T Communications. They wanted a reliable, stable software developer with a proven track record—a company with experience in providing a complete line of both MS-DOS and UNIX system products. And Samna is cur-

continued on page 150

AT&T and Samna Introduce Write Power

IBM PC 640K Mother Board Upgrade

A 640K Mother Board Memory Upgrade for the IBM PC has been added to the product line of Aristo Computers.

The memory upgrade allows installation of 640K RAM on the PC system board without using any expansion slots!

The IBM PC memory upgrade is composed of a miniature module and two patent pending connectors. The module is plugged into an existing socket on the system board (U28). Several wires that extend from the module are easily soldered to existing chips on the system board. If needed, the upgrade kit can easily be removed by reversing the installation procedure. Installation time is approximately 30 minutes.

The upgrade is a reliable expansion card due to reduced chip count, reduced power consumption and reduced heat dissipation. It is an ideal product for those users who are short on card slots and dollars, but do not want to compromise performance and reliability.

The PC upgrade is fully compatible with all DOS versions above 1.xx. It is not suitable for the various IBM-PC clones.

The PC upgrade retails for $59.00 and is offered to both dealers and end users. It comes with a 30 day money back guarantee and a 2 year limited warranty.

In addition to this newly announced upgrade, Aristo Computers carries upgrades for the IBM-XT ($39.00) and the COMPAQ Portable ($29.00).

For additional information, contact Aristo Computers, 16811 El Camino Real, Suite 213, Houston, TX 77058; (800) 3ARISTO, or in Texas; (713) 480-6288.

Mention that you read about it in *Computer Shopper*. ●

PC XT
$699
ASSEMBLED & TESTED (48 HRS)
CALL FOR DEALER PRICES.
640K
FEATURES
640K 2-360K Drives Clock-cal.
RS 232 PORT-PARALLEL PORT-GAME PORT
RAM DISK-PRINT-SPOOLER-ENHANCED KEYBOARD
8 SLOT XT MOTHER BOARD — IBM™ XT COMPATABLE-8088 MICRO PROCESSER WITH 8087 SLOT-150 WATT POWER SUPPLY CAN HANDLE 2 HARD DRIVES-ENHANCED KEYBOARD WITH LIGHTED NUMBER AND CAPLOCKS.
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FLIGHT SIMULATOR LOTUS dBASE
I.B.M. DIAGNOSTICS DOS 2.1 MS-DOS
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* Normal, enlarged, condensed
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MANNESMANN TALLY $595
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COLOR GRAPHIC CARD RGB & Composite..... $99
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(12") $79
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TERMS: Minimum order is $10. For orders less than $60, add $5 shipping & handling for UPS Ground delivery or $10 for UPS 2nd day air. Orders over $60, add 5% for shipping & handling for UPS ground. 10% for 2nd day air. COD orders add $2.50 to above fees. New York residents add proper sales tax. COD payment must be cash, certified check or money order. Phone and mail orders can pay by Visa, MasterCard, Amex.. or COD. We accept personal checks with mail orders, but allow two extra weeks for processing.

SEEDS

The famous APPLE-SEED and APPLE-SEED II are the books that see all, tell all on the various APPLE clone motherboards and peripherals. They are well worth the $12.95 that we are asking. And KOSMIC has been at it again on IBM clone motherboards and peripherals and has composed the one and only "BIG BLUE SEED". It goes into greater detail on a smaller number of motherboards and peripherals (over 20 and growing) and will help you to build many of them at a saving

APPLE-SEED I (Clone Motherboards)..... ....$12.95
APPLE-SEED II(over 75 clone plug in cards for II+,IIe) $12.95
BIG-BLUE SEED(Over 100 hundred clone cards $14.95

TRANSFORMER $19.95

This isolation transformer has 4 120 volt windings, each separate, and so can be used as a step-up or down unit. In addition each winding is tapped at 105-110-115-120 for voltage adjustment. The unit is good for 250 watts(2A at 120 V or 1A at 220 V).....$19.95

RIBBON CABLE CONNECTORS (IDC)
INSULATION DISPLACEMENT CONNECTORS

DB STYLE (D-SUBMINIATURE)

PUT NUMBER OF PINS WHERE "XX" IS TO FORM PART NUMBER

			9	15	25	37
SOLDER CUP	MALE	DBxxM	75	85	1.10	1.60
	FEMALE	DBxxF	80	90	1.15	1.65
RIGHT ANGLE	MALE	DBxxMR	1.10	1.35	1.75	2.25
	FEMALE	DBxxFR	1.15	1.45	1.85	2.35
RIBBON CABLE	MALE	DBxxIDCM	1.95	2.25	2.50	3.95
	FEMALE	DBxxIDCF	2.25	2.49	2.49	4.50
HOODS	METAL	MHOOD	.99	.99	.99	1.25
	PLASTIC	PHOOD	.49	.49	.49	.59

PIN HEADERS

	10	20	26	34	40	50
SOLDER PIN MALE S	.45	.65	.85	1.25	1.50	2.25
SOLDER PIN MALE RA	.60	.75	.95	1.35	1.50	2.50
RIBBON FEMALE	.90	.90	1.25	1.45	1.80	1.99
RIBBON CARD EDGE	1.50	1.95	2.35	2.25	2.50	3.50

FLEA CLIPS 12 FOR $2
(SHORTING BLOCKS)

CENTRONICS 36 PIN

RIBBON MALE	2.95
RIBBON FEMALE	2.95
SOLDER MALE	1.95
SOLDER FEMALE	1.95

EASY TO GET SNAPPABLE HEADERS

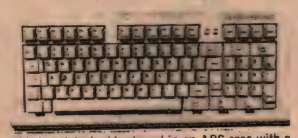
40 PIN S	.95
40 PIN RA	1.35
80PIN(40x2)S	2.25
80PIN(40x2)RA	2.75

APPLE IIE®
DETACHED KEYBOARD

$99.95

A GEM of a keyboard, in a nice beige ABS case. Lets you build an IBM look-a-like that runs like a IIE with 2 drives in case using our $69.95 case on this page. This KB is fully IIE compatible, with all functions.....

MAK II ACCUFEEL KEYBOARD

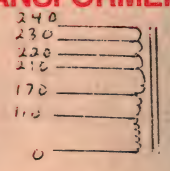


This is a detached keyboard in an ABS case with a 6" curly cord to connect ot to 6502 based machines. It used a serial data format for error free transmissions down the curly cord with a serial to parallel to converter board on the end that is fully 6502/ Apple compatible. Has auto repeat, beep, no beep, 10 user programmable macros, 50 preprogrammed macros, auto line number.

$119.95

LINE ADJUSTING AUTOTRANSFORMER

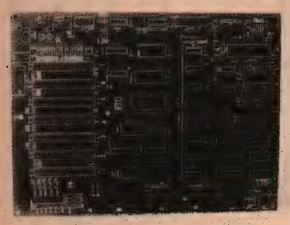
$29.95



This 1400 watt autotransformer is tapped at 110-120-170-220-230-240 volts and can be used for step-up or down or line voltage adjustment. Rated at 14A at 120V or 7A at 220 Volts it is especially good for operating European items in the USA or vice-versa.....$29.95

DISC DOUBLER $5.95

APPLE IIe
CLONE MOTHERBOARD



100% IIe compatible motherboard, for those who wish to build a clone of the ever popular APPLE IIe. It is a reverse engineered copy with no infringements on it. The gate array custom IC's are new designs that work-a-like but do not violate any copyrights. We do not sell the software but you can buy a IIe upgrade kit and install it on the board. You can not remove the gate array chips to install custom boards as they are not the same as Apple's ones, but this is not a problem with any plug in board as it is 100% hardware and software compatible.

Bare PCB and data $99.95
Custom IC set (3)...$49.95
Keyboard Encoder.$14.95
Character Gen $14.95

MOTHERBOARD WIRED WITH 64K

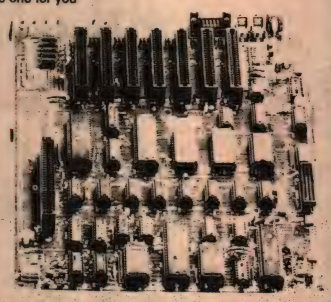
$199.00

Yes this is a copy of the ever popular IIe computer, it has no software on it and the custom gate array chips are brand new designs that do not infringe at all. The board is 100% software compatible and 100% hardware compatible. It will not operate with add-ons that require the removal of the gate array custom IC's as they differ in pinout. It will operate upgrade software that can be bought at any dealer, and the original software. We do not suggest you make and sell clones, just make one for you to use at home and no-one will bother you.

IIe EXT 80 COLUMN CARD

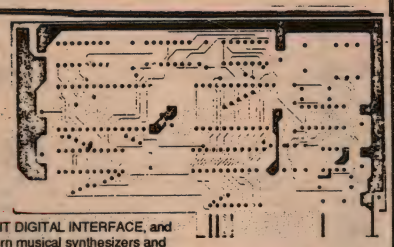
A great card that adds 64K and 80 columns to the IIe. Lets you have wide screens and 128K of RAM on call

$45.00



MIDI
MUSIC BOARD

Apple wired PCB	$99.95
IBM wired PCB	$129.95
Apple bare PCB	$14.95
IBM bare PCB	$19.95



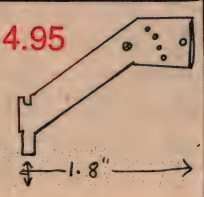
MIDI is an acronym for MUSICAL INSTRUMENT DIGITAL INTERFACE, and is a powerful new standard interface for modern musical synthesizers and other new equipment. All the Japanese makers and most in the USA have conformed to the standard.
The MIDI sourcebook is a valuable source of data for the APPLE and IBM MIDI user. There are many starter programs and listings of places to buy and how to build, fix, make, etc for the MIDI-MAN. Pls specify APPLE or IBM when ordering.

$19.95

BAR CODE WAND HEAD

$14.95

This is a real deal for the point of sale player. A complete guts for a bar code wand. It has the matched set of IR LED and Schotkky diode IR detector in a fiber optic case that takes the input and output through a special IR transparent head that is black to visible light to stop interference. Complete with data sheets and std bar code and instructions how to interface to an IBM or APPLE via the serial port. A good deal.....
IBM software package.....



ABS PLASTIC CASE

$49.95

This case is a nice fit for our motherboard, keyboard, and power supply. Please tell us if you wish IIe or II+ (Numeric or non) cutout.

please specify II+ or IIe case style

KEYBOARD

This keyboard fits our case, and comes in both the IIe and II+ format(Numeric or non) as you require. The II+ types have 88 pre-recorded basic commands and other MACROS for you ease of use in programming.

IIe.....$54.95
II+(Num).$59.95
II+(Non).$54.95

PARTS PARTS

0.1 Mono caps, 0.2"	$0.10	100Ns delay line	$6.95
0.1 Mono caps, 0.1"	$0.12	7 Ns delay line.	$9.95
50 Pf trimcap	$0.75	62 Pin edge conn	$2.00
2-3" speaker	$1.50	50 Pin edge conn	$1.50
RCA jack, PC type	$0.49	5 Pin DIN conn	$1.50
APPLE power set	$3.50	8 Pos DIP switch	$1.00
6 pin row power set	$1.49	MEGABOARD reset Sw.	$2.49
square power set	$2.49	4.7Kx6 SIP	$0.69
MPSA13	$0.49	4.7Kx8 SIP	$0.99
2N4258	$0.75	1Kx7 SIP	$0.59
2N3904	$0.29	1KX8 SIP	$0.59
2N3906	$0.29	2.2Kx9SIP	$0.79
2N2222	$0.35	10Kx9 SIP	$0.79
2N2907	$0.39	33 Ohm DIP	$1.49
MPSU51	$1.00	4.7K DIP	$1.49

$29.95

1X	10X
DC-10Mhz	DC-100MHZ
35ns	3.5ns
55Pf + I/O cap	Nominal 16Pf
1 Meg Ohm I/P	10Meg ohm
600 V(AC+DC)	

APPLE PCB

We ran out of the APPLE ADD-ON Bare PCB and had to go to our supplier to get a real deal from him so we could sell more boards. But we could not get a good enough price to keep the sale prices as we were buying fresh stock, but we asked him for a real deal and we kept the price rise to a minimum.

3 FOR $13.00

Disc, 16K, 80 Col, 80 Col SS, RS232, Communications, Sprite, 13/16 Disc Z-80,

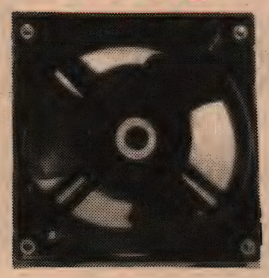
2 FOR $12.00

Super Serial, IIe Ext 80 Column 128K, SSM Modem,

2 FOR $17.00

Applacard, 256K Appla Add-on, Eprom,Grappler, 9 Voice music RGB, Prototype(L or S) Sam, Time II, Thunder Clock,

FANS



Has your IBM look-a-like system started to make funny grinding noises as the Taiwanese fan bearings start to run out of oil, if you have oil-no problem, but unless you do something the neighbours will soon call the police. We got some nice American fans, in 3" and 4¼" sizes 110 Volt new and like new from equipment (checked)

3" NEW	$14.95
4¼" NEW	$14.95
3" USED	$ 9.95
4¼" USED	$ 9.95

HARD DRIVE CABINET

$59.95

This is a very nice case for your hard drive, it has space for 2 1/2 height drives with cover-up bezel for one only. The back is cut for fuse holder, AC plug, switch, connector panel and 3 1/2" AC or DC fan.
We also have some switching power supplies for one or two drives. The 40 Watt unit has 5V-4A and 12V-1.5A and the 60 watt one is 5V-7A and 12V-2.5A.

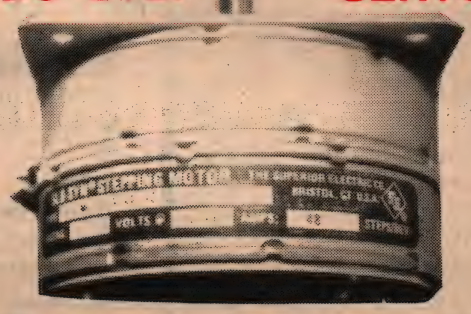
40 W $39.95 **60 W $59.95**

ASCII KEYBOARD

$19.95

This is a really good deal. This keyboard came from AES Data Inc, one of the largest makers or word processors in the world. They paid over $100.00 each. Their loss is your gain. The keyboard uses a dedicated micro for 5V operation and has HALL effect switches, the worlds most reliable. Made by Microswitch. Fully sculptured keytops in beige. With full data. Has a unique program thst makes both serial and parallel data. Proper typewriter pattern for instinctice use.

DC STEP II SERVO



A high qualit DC step servo motor for the robot freak. 15V at 0.49 Amps, 7.5% per step. Good torque, Brand new with data sheet.

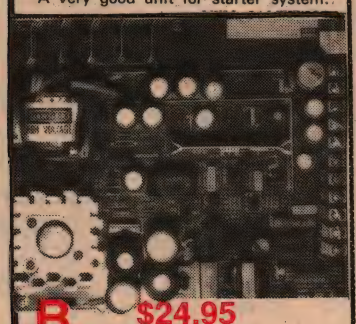
$6.95 2/$10.00

SWITCHING POWER SUPPLIES

A

$35.00

One of the nicest open frame IBM type switching power supplies we have ever seen. Came from the defunct NCR IBM compatible, runs the whole thing, has +5V-7A, +12V-3A, -5, -12-¼A. A very good unit for starter system..



B **$24.95**

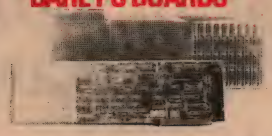
The greatest 8" Drive supply we have ever found. Has 24V-2.2A 5V-3A and -12V-.17A. All you need for a dual 8" Drive system. A switching power supply by ASTEC . .

C

$18.95

Another great deal from PARTS GALORE A small switching power supply that has +5v-4A, +12v-1A,-12v-1A,-5v-1A. All at the same time These cost Northern Telecom over $50.00 when they bought 10,000 of em. We got em when a subcontractor went belly up for 10% of what they paid and we are selling them for only..... .....$18.95

IBM COMPATIBLE BARE PC BOARDS



All these bare PCB come with a parts list , placement diagram showing where they go. We do not have circuit diagrams unless indicated. The EPROMS and PROMS are for sale as is certain non-infringing software for use with the boards.

HEXPACK A workalike copy of the famous AST SIX-PACK , WITH UP TO 384K RAM, Clock, Calendar and Serial and Parallel ports. 100% IBM and AST compatible, complete with schematic, parts placement and assembly data.....$24.95
Optional complete manual and software diskette.....

MONTE CARLO One of the best multifunction cards we have ever seen. This one takes either 64K or 256K RAMS in any combination for up to 1 Mbyte on board. (640K DOS accessble, balance subroutine accessed) PLUS two game ports, Clock, Calendar and Serial and Parallel ports. Clearly an awe inspiring array of functionality on a single card. Complete with schematic, parts list and placement diagram.....$34.95
Optional complete manual and diskette.....

COLOR GRAPHICS A workalike copy of the popular PERSYST color graphics card. 100% true to original and 100% compatible to IBM std. With assembly data.....$24.95

384K RAM only in close array, 384K of 64K RAM ideal for economy enhancement of system capacity. With all assembly data.....$16.95

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KRAM CARD We took a 512K card and rewired it for 256K RAMS. It now has four times the memory or 2 MBYTES. It closely follows the function of the popular JRAM card as all this type do, and also shares partition ing parameters to the extent that it will run the JRAM software or other similar programs. RAM Disc Drives are very easy to delineate. With all assembly data..$34.95

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PROTOTYPE+RAM This unique card has a memory array at one end. 36 16 pin sockets are placed in copper on board with all bussing in common, but with CAS, RAS etc brought out row by row and column by column so that either 64K or 256K RAMS can be quickly wired in. A 0.1 bypass cap is on each IC as well. The remaining ¾ of the board is 100% WW holes with a DB-25 and DB-9 footprint on one end.....$24.95

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MONO GRAPHICS A workalike copy of the very nice HERCULES mono card, with static RAM on board. With all assembly data.....$24.95

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This is a unique board for cleaning up data line noise in the clones. This noise is caused by the 2 layer boards that most clones use. IBM uses a 4 layer board with much better noise suppression. Each data line is held 2.7 volts with an R-R network that stops all + or- spikes from causing those crashes that often bother the clones. Especially helpful for use with TURBO motherboards or TURBO plug in boards.

FOR ANY SLOT
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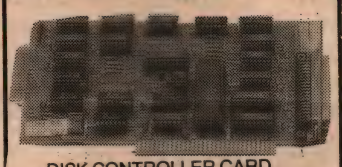
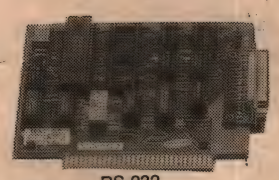
NEC 8087

As you know NEC has been hard at work making a work-a-like copy of the 8087 math co-processor chip. Rumor has it that it will have enhanced capabilities over the 8087 in the same way the V-20 is enhanced over the 8088. We are getting some in in June and can sell them for only $119.00 each for the 5 Mhz version. Further data available in June as well as data sheets. Orders are on a first come first served basis. NO COD's

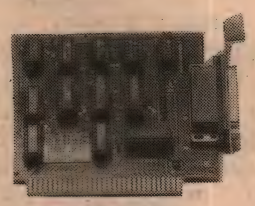
NEC 8087.....$119.00



DISK CONTROLLER CARD



RS-232
COMMUNICATION CARD



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- ½ Height • 48 TPI
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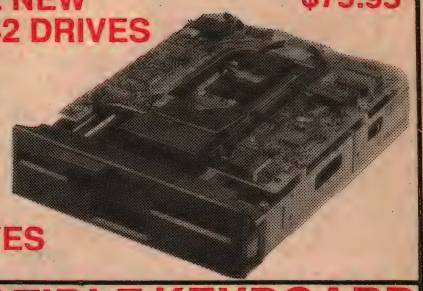

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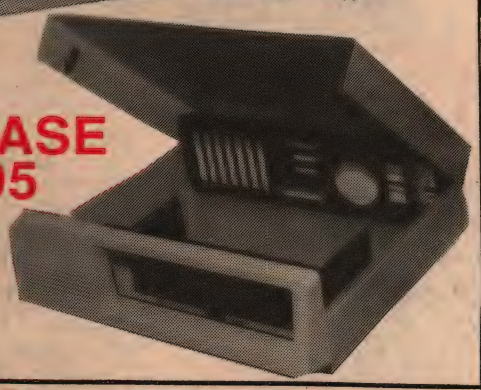
IBM COMPATIBLE KEYBOARD

We just got a great deal on an IBM compatible keyboard made in the USA by MAXISWITCH-INC for a major OEM. This OEM decided to exit this field due to the serious drop in prices caused by the clones. He sold us these keyboards for less than 10% of the $120.00 he paid for them, letting us sell them to you at a real deal. They are well designed for easy use with a built in wrist rest for non-fatigue typing. Has all IBM keys with the function on the top as shown. Very good feel, American quality, not the Taiwan El-Cheapo sold all over for $50-$70.....$39.95

$39.95

WITH AT ASPECT $59.95

A nice case that looks like the AT but is cut for the XT in both height and width. Fits backswitch power supplies.



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80287 Math Processor (Same as PC-AT)	Runs Intel 80286 at 6,8,10&12 MHZ! (Software selectable)
Standard Power Connector (Same as PC-AT)	Peripheral Support Circuits (Same as PC-AT)
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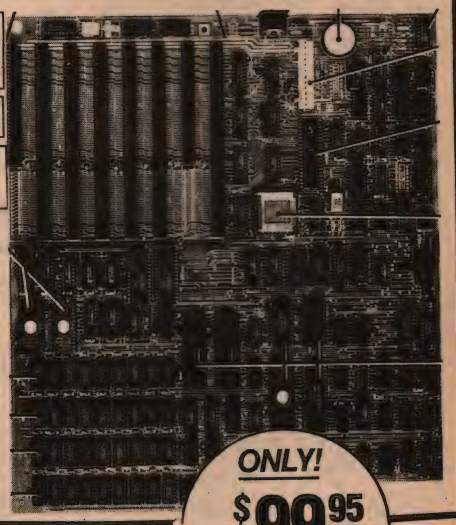
Board Size: Standard IBM-AT*
Dimensions: 12 inch × 13.8 inch with 6 mounting holes to fit all AT compatible cases.



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HITACHI RGB

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HITACHI, The most famous name in color monitors, made these for a famous OEM and we got em cheap as the market went soft this summer. They are RGB, Medium resolution with full 240x600 dots for full IBM graphics capability. Far better than the 240x400 low res monitors that will not show full IBM details.

240 X 600

QUADRAM COLOR 1

YES the famous QUADRAM COLOR 1 IBM compatible color graphics card is now for sale here for $89.00. Do not confuse this card with the Taiwan clones that are everywhere for $69.95. This is the real American design with it's long term reliability and performance.

$89.95

New Multilingual Word Processing Program

The first multilingual word processing program capable of changing from one language to another with just a keystroke was introduced recently by Intex Software Systems International, New York.

Called INTEXT, the program automatically reconfigures the computer keyboard to the national standard of any one of 41 foreign languages with just the stroke of a computer key. Included are those languages with non-Roman alphabets, such as Hindi and Russian, and those written from right-to-left, such as Urdu, Hebrew, Arabic and Farsi. Moreover, the program allows the user to switch back and forth from one language to another in the middle of the text.

"Until now, if you needed a professional and business-like word processing program in any other language than English, chances are it had to be especially written for you—at a substantial cost in time and money," according to Awni K. Abboushi, Intex president. "In some cases, you had to buy special hardware, and in others you had to buy a separate keyboard for each language. INTEXT changes all that."

A basic word processing program, in English or any other language, INTEXT is designed to serve office needs. Output can be printed on a wide variety of dot matrix, laser or letter quality printers.

(Graphics capability is needed only for languages with non-Roman alphabets.) Among the languages currently offered by INTEXT are English, Arabic, German, British, Danish, Spanish, Italian, Hebrew, French, Dutch, Portuguese and Russian, with others now being developed.

INTEXT is primarily menu driven, with no complex commands. Nor does it differ substantially from most other word processing programs in the simplicity of its operation. Simple menus allow you to open files, enter text, format the page, edit the text, and print the result. A few basic commands, using only one or two keystrokes, perform such functions as block moves, searches, formatting and others. For most cursor moves and editing, INTEXT uses the IBM PC keyboard features (insert, delete, the arrows, etc.). It requires only 128K of RAM to operate. Suggested retail price is $495.00 for two languages.

According to Mr. Abboushi, other programs currently in development will apply the same principles of language facility to other applications.

For more information contact INTEX Software Systems International, LTD., 488 Madison Avenue, New York NY 10022.

Mention that you read about it in *Computer Shopper*.

New Version of One-Write Plus With Expanded Chart of Accounts

Great American Software, publishers and marketers of One-Write Plus, announced recently that they will begin shipping a new version of the master module of the computerized bookkeeping software this month.

The new One-Write Plus Master, version 1.02, is designed to meet the needs of specific types of businesses and organizations through the addition of 12 new standard charts of accounts. The charts of accounts in the new version include pre-formatted financial statements designed specifically for each type of business or organization.

The manual one write bookkeeping system is currently used by approximately 5 million small to medium sized businesses and professional firms. Recommended widely by accountants, One-Write Plus reduces the time it takes to complete monthly bookkeeping tasks from days to hours.

"Previous to version 1.02, many users couldn't get full benefit out of One-Write Plus because it wasn't designed to meet all the specialized reporting requirements of specific industries," said Roger Melanson, president of Great American Software. "With the new charts of accounts, users will be able to select, from a menu of options, financial statement formats that are tailored specifically to their organization."

The new charts of accounts were selected on the basis of studies made of Great American's existing end-user customer base. The new charts of accounts are for:

Accountants
Attorneys
Manufacturers
Non-profit organizations
Local Governments
Real Estate & Property Management
Services & Professionals
Doctors & Dentists
Churches
Clubs & Associations
Builders & Contractors
Personal Finance

The original One-Write Plus Master, version 1.01, featured only two charts of accounts: "general business" and "partial" (create your own). They remain as available options.

In response to customer requests, One-Write Plus Master, version 1.02, has also been further revised so that it is compatible with Sidekick, ProKey, and other "memory-resident" utility programs.

The original One-Write Plus Master, version 1.01, began shipping in the fall of 1984 and is widely used by professionals such as doctors, lawyers, and accountants for their business bookkeeping. It is also used by many different types of small to medium sized businesses and non-profit organizations including churches, retail stores, manufacturers, restaurants and services.

One-Write Plus modules for Accounts Receivable, Accounts Payable and Payroll began shipping in the fall of 1985. As an organization grows, one or more modules may be added to expand the functions of the One-Write Plus bookkeeping system.

For additional information contact Great American Software, Inc., P.O. Box 910, Amherst, NH 03031; (603) 889-5400.

Mention that you read about it in *Computer Shopper*. ●

Samna
continued from page 147

rently the only major software developer with that expertise."

Both Write Power products feature hot key connectivity to the SSI IRMA card and connectivity to AT&T's Starlan Network.

Although Mr. Anderson declined to reveal the total dollar value of the multi-million-dollar agreement, he emphasized that it represented a significant, long-term commitment to Samna products. He further stated that the agreement will not affect his firm's continued marketing of its products through distributors and value-added resellers.

The Write Power products are marketed by AT&T Information Systems. Write Power 1 is priced at $495; Write Power 2 is priced at $745.

For additional information contact Samna Corporation, 2700 N.E. Expressway, Atlanta, Georgia 30345-1807; (404) 321-5006.

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640K MOTHERBOARD
21 MEG HARD DRIVE
640K RAM INSTALLED
FLOPPY DISK DRIVE
HARD DRIVE CONTROLLER
FLOPPY DISK CONTROLLER
SERIAL PORT GAME PORT
PARALLEL PORT
CALENDAR CLOCK
135 W POWER SUPPLY
'AT' STYLE KEYBOARD
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DL-XT TURBO
4.77 — 8.00 MHZ HARDWARE SWITCHABLE
640K MOTHERBOARD
21 MEG HARD DRIVE
640K RAM INSTALLED
FLOPPY DISK DRIVE
HARD DRIVE CONTROLLER
FLOPPY DISK CONTROLLER
SERIAL PORT GAME PORT
PARALLEL PORT
CALENDAR CLOCK
135 W POWER SUPPLY
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$1099.95

1 MEG MOTHERBOARD
21 MEG HARD DRIVE
1 MEG RAM INSTALLED
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HARD DRIVE CONTROLLER
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2 MEG MOTHERBOARD
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512K RAM INSTALLED
1.2 MEG FLOPPY DRIVE
HARD DRIVE CONTROLLER
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PARALLEL PORT
CALENDAR CLOCK
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all kits include cables & controller for XT
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30 MEG AT DRIVE $610.00
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Robot Hero 2000 continued from page 70

using the cassette port operating at 300 baud using 2400/1200Hz.

The torso also carries the voice synthesizer that uses an SSI 262A Speech Synthesizer chip programmed for text-to-speech, phonemes, and sound effects. Sound duration has four settings and features 4096 inflection levels instantaneously with 32 in the transitioned mode at 8 rates. Amplitude is 16 levels, articulation has 8 rates, and the voice tract filter has in excess of 250 settings.

The sonar processor is an 8042 UPI generating several different ultrasonic frequencies. It uses two transducers (one in the base and the other in a rotating mirror "lighthouse" on the head of the robot) and takes 24 range bearings, 15 degrees apart. The range is from 4 inches to 10.5 feet with a resolution of one-half inch. The rotating mirror is also shared with the light detector.

The head also carries a 17-key keypad that uses an 8042 UPI operating at 6 MHz. The associated display uses six 7-segment LEDs and via an internal real-time clock, provides time, day, date, day of week, leap year, sleep time, and daylight savings. Robot "sleep" time can be preset from 1 minute to 65.536 minutes (over 45 days).

Eight status indicators (driven by the I/O board in the torso) display charge, power, float, low battery, voice, cassette, transmit, and receive.

The head also contains an audio amplifier and speaker to amplify the sounds generated by the voice synthesizer.

The robot portion of the optional Remote Console RF link (and associated antenna) is also mounted on the head and operates in the 75 MHz band with an approximate 100 foot line-of-sight range, can transmit 33 characters per second, and the robot must receive permission from the operator's Remote Console to transmit.

The terminal mode operates in full duplex mode using 110, 300, or 600 baud: it has auto repeat with approximately seven characters per second (may be disabled). Auto scroll has a one to eight second delay between lines (can be disabled).

The remote mode allows the Remote Control to be used as a terminal or teach pendant.

The elastomeric 70-key ASCII keyboard used in the remote features a 2-line by 40 character LCD display whose contrast can be controlled.

The optional Experiment Card (ET-19-14) allows for user-developed hardware experiments. The card plugs into the back plane and the breadboarding socket is provided with three fused power sources (5-V, 12-V, and sleep) and all the bus lines.

Now for some details.

Basic Motor Control

The five "power" motors used in the robot (two for drive, one torso, and two in the arm) use a circuit similar to the basic arrangement shown in Figure 2.

Each channel uses an 8042 UPI (Universal Peripheral Interface)—a single-chip microcomputer containing a CPU, ROM, RAM, and I/O. The ROM contains the motor operating algorithm used by the system (robot) computer.

The UPI forms five functional blocks—a frequency generator, a distance-to-go register, a controlled switch, an up/down counter, and a pulse-width modulator interconnected as shown in Figure 3.

The system computer loads the distance-to-go and desired velocity into the distance-to-go register and the frequency generator respectively. The latter circuit converts the desired velocity into pulses. The pulse output of this stage simultaneously decrements the distance-to-go register and increments the up/down counter via the controlled switch.

When the distance-to-go register reaches zero, it turns off the controlled switch and prevents further pulses from the frequency generator from reaching the counter. The pulse-width modulator drives its associated motor by ad-

continued on page 152

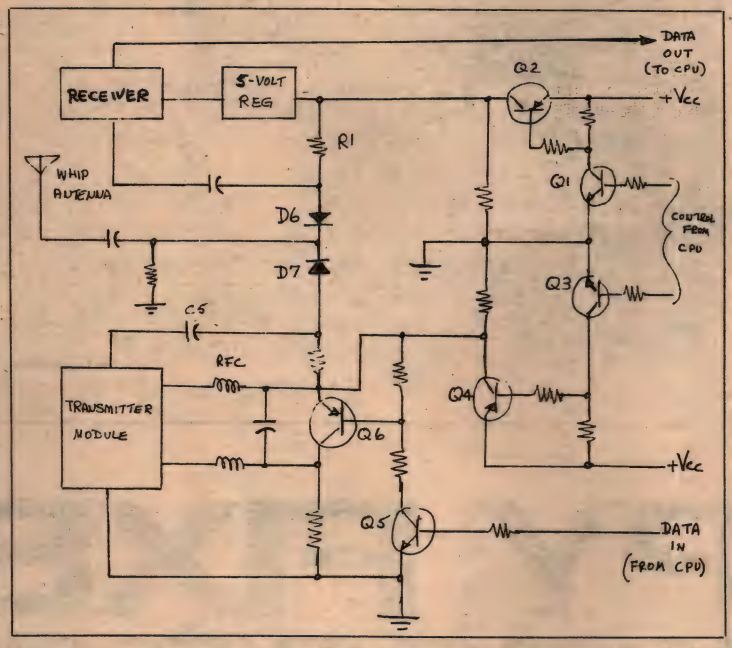

Figure 5

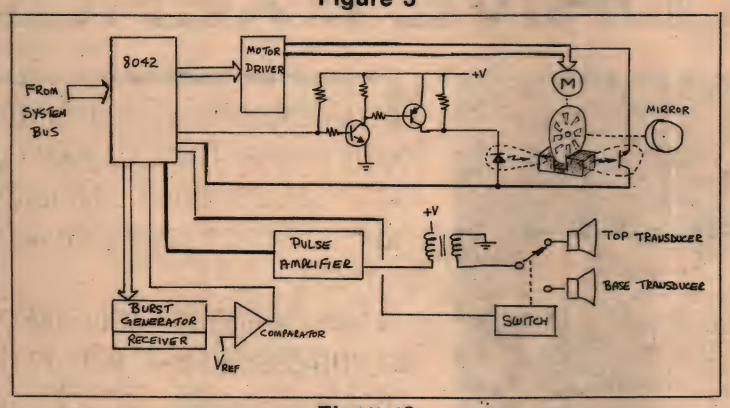

Figure 6

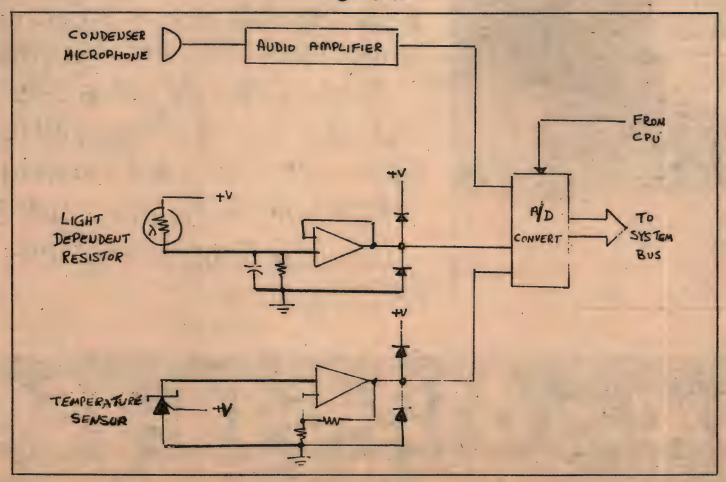

Figure 7

DISK MULTI-I/O

* FD Cont * 1 Ser Prt * 1 Par Prt * 1 Gme Prt * Clk/Cal * Cables
Qty 1 $81 * Qty 2 $79 * Qty 5 $77 * Qty 10+ $76

MULTI-I/O PLUS II

* 2 Ser Prts (1 opt) * 1 Par Prt * 1 Gme Prt * Clk/Cal * Cables
Qty 1 $57 * Qty 2 $55 * Qty 5 $53 * Qty 10+ $51

MULTIFUNCTION CARD 0K/384K

*1 Ser Prt * 1 Par Prt * 1 Gme Prt * Clk/Cal * Cables * Sftwre * Manual
Qty 1 $81/$132 * Qty 2 $78/$129 * Qty 5 $76/$126 * Qty 10+ $73/$120

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Robot Hero 2000
continued from page 151

justing the duty cycle based on the value coming from the up/down counter.

If the counter contains a low value the duty cycle will be low (10% on time for example), and conversely, if the value is high, the duty cycle will be high (90% on time for example).

The basic motor drive/feedback arrangement is also shown in Figure 2.

The UPI pulse-width modulator output represents speed while the other UPI output is direction. These bits are fed to four and dates to create forward and reverse motor pulses. Four power MOSFETs drive the dc motor.

When an "up" pulse is output from the UPI. FET1 and FET4 turn on while FET2 and FET3 are turned off. Current then flows through FET4, the dc motor, and through FET1 to ground. When a "reverse" pulse appears, the FETs change modes and current then flows through FET2, the motor, and FET3 to ground with FET1 and FET4 turned off.

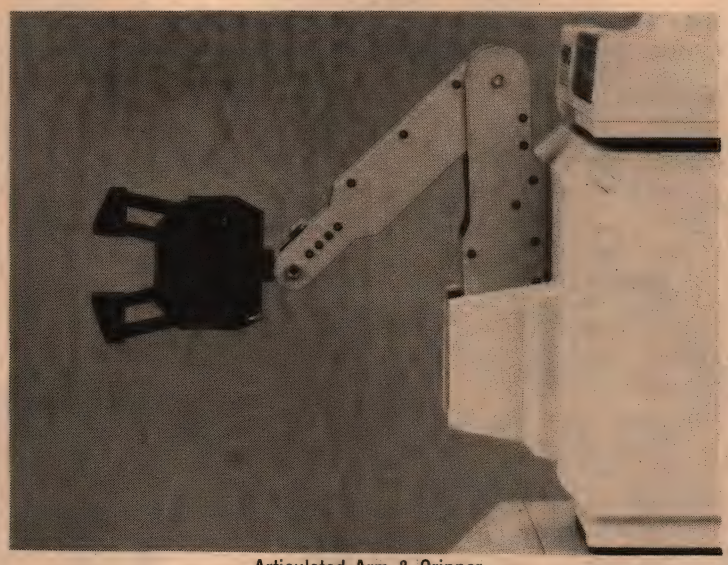
The associated motor also drives a chopper disc that passes through slots in a pair of opto-devices mounted 90 degrees apart.

Each opto-device consists of an infrared emitting LED in one arm, an air gap, and a phototransistor in the other arm. As the chopper disc rotates in the gap separating the two semiconductor devices, each time the infrared beam is broken as the transparent/solid sections of the disc pass through the beam, the phototransistor generates pulses.

Having two opto-devices spaced 90 degrees apart allows the robot to determine direction of rotation as well as speed.

Each opto-device drives a pair of the voltage comparators that both square up the signal, and provide enough hysteresis so that the signals will not be adversely affected by unwanted noise pulses. The outputs of voltage comparators are fed back to the UPI.

On-Board Programming Keypad.



Articulated Arm & Gripper

Remote Console

The Remote Console is primarily intended for real-time control of the robot, although it can be used to interface the robot to a remote RS-232 terminal or computer.

Using an elastomeric 70-key ASCII keyboard, the display is via a 40 character by 2 line LCD. Battery life is 4 to 6 hours from full charge. Overall size is 16" wide, 6-3/8" deep, 2-1/2" high and it weighs 3.2 pounds.

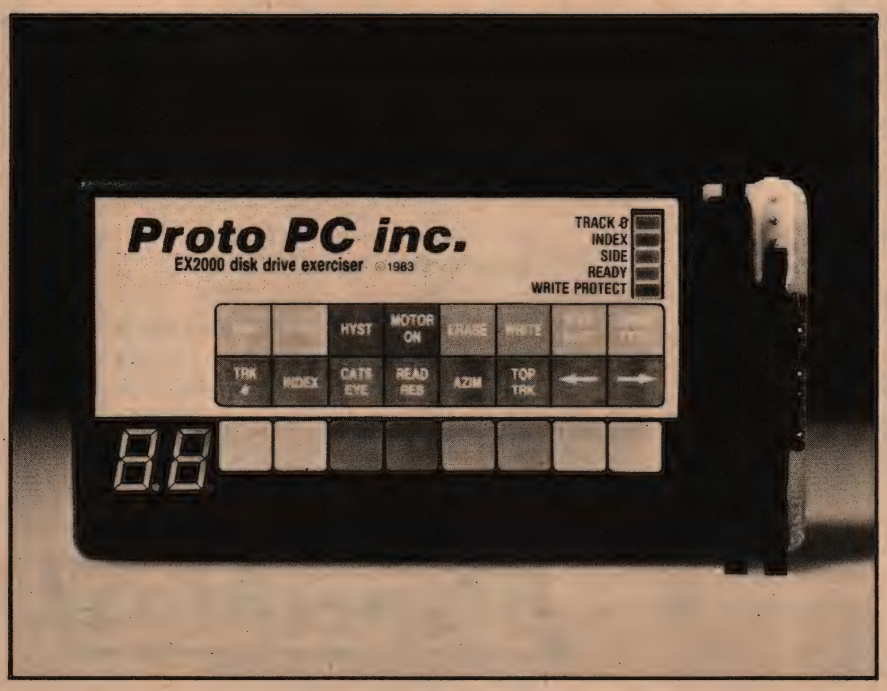
In the Terminal Mode, operation is full duplex selectable from 110, 300, or 600 baud. Auto-repeat is approximately seven characters per second, and there is an approximate one to eight second delay between lines in auto scroll.

In the Link Mode, an external device can be linked via the RF system. Baud rate in this mode is also selectable from 110, 300 or 600 baud.

The Remote Mode is used for terminal or for a teaching pendant for the robot. Operating in the 75 MHz band... range is approximately 100 feet, and the transmission rate is fixed at 33 characters per second. In this mode, the robot must receive permission to transmit to ensure that the remote is ready. If a line of data is received at either end

continued on page 155

FLOPPY FIXER
EX2000 DISK DRIVE EXERCISER



Here's the ultimate ten minute exercise for floppy drives. The EX2000 is used with an alignment disk and oscilloscope to align and repair any floppy with a standard interface.

It was designed by service people to be fast and easy to use, with features like variable step rate, single keypress to any alignment track, hysteresis and speed tests, and a price that fits your budget.

Options include cable sets and alignment disks for 5" or 8" drives, all backed by Proto's commitment to customer service.

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Probots And People continued from page 69

tionable technology when, for the fraction of the price, you could purchase a sophisticated and very reliable home alarm system that protects your windows, doors, and so forth with proven technology? The only way this problem can be solved is to develop reliable robot sentries at a reasonable price.

As more features are added at a lower price, and as more reliability is built into personal robots, applications such as entertainment and serving as a sentry will become more practical. For a while longer, though, we're going to have to tolerate robots that are little more than sophisticated playthings with a very big future.

Applications Of The Near Future

In late 1986 and 1987, personal robots should really begin to have useful applications so that they make sense to have around the home and small business. With more sophisticated heat, motion, and sound sensors, tactile feedback, voice synthesis and recognition, greater mobility and navigation, and anthropomorphic design, "probots" should come into their own as useful home appliances.

One possible use for personal robots will be vacuuming. There are some hurdles to overcome, however, before a vacuuming robot is practical. First of all, if homes were simply empty boxes, a robotic vacuum would be extremely easy to design. The robot would start at one corner of the house, travel forward until it bumped into a wall, rotate 90 degrees left, proceed forward about a foot, rotate 90 degrees left once again, then repeat the process until it completed the entire house. However, walls and furniture pose a problem for engineers. Getting the robot to thoroughly vacuum the entire house, complete with manuveuring around doorways and getting around sofas, tables, chairs, and other obstacles will require sophisticated navigation hardware and software. Some companies are already facing up to this challenge, however, and are going to be introducing vacuuming robots in 1986.

However, even if a robot could make its way around a home, how are you going to give it enough power to create the kind of suction most vacuums have? A large battery or a wired electrical connection are two possible solutions. The bottom line is that if people are going to buy a robot vacuum, they want it to do a thorough job without leaving any dirt behind. Hopefully by 1987 a truly useful and inexpensive robot vacuum will be introduced to the mass market.

The RB Robot Corporation apparently used an idea from the movie *Star Wars* by planning to install a fire dectector/extinguisher on the RB5X (to my knowledge, this add-on, like most of the others, was never made available to consumers). We certainly have the technology to know if a fire is present, and hooking up a robot to emit a loud warning if it detects a fire could be done very easily today. However, equipping the robot with the heat and light sensors to *find* the fire and extinguish it would really make it a valuable friend to have around the house; I believe this sort of application will be on robots by late 1986.

The home is certainly not the only place personal robots could be useful. In the school robots could deliver materials, tell stories, assist the teacher, instruct children on languages, and tell children about computers and robots. In addition, businesses could use robots to roam around the office to deliver mail or memos or make their way around retail stores to announce sales and new products and to help people find whatever they are looking for. A "roving robot" with a tall flag on it could be in a large store like K-Mart that sometimes doesn't have many people around to assist you; you could go up to the robot and press a button corresponding to the product you want to find. The robot could then courteously lead you over to the area, perhaps describing some of the new products in that department along the way.

The late 1980s should certainly enjoy some exciting advances in the world of personal robots. Prices should drop dramatically while more features and more powerful software become available. However, just for fun, let's let our minds wander and see what the robots of the more distant future—such as the early 21st century—may have in store for us.

Long-Term Dreams

By the year 2000, incredible advances in all robots, some of which we probably couldn't put into words today, will have taken place. Robots will have arms that have the dexterity of the human arm but can lift much more. Robots will resemble humanoids and will have voice synthesis and recognition so sophisticated that a conversation with a robot will not be too much different than talking with another human being. Moreover, the navigation, vision, and mobility systems of robots will be sophisticated enough so that they can work in the home without our having to build the home around *them* and their limitations.

In the home, perhaps personal robots will be able to vacuum, sweep, mop and do small clean-up chores. If we can develop a dishwasher specially suited for robots, perhaps they will also be able to clean the dishes and put them in their proper place. Robots can serve as guards, babysitters, and companions. Moreover, they will gain "intelligence" by existing in the home environment, learning from it, and learning facts about you and your life so you can talk with it as you would a friend. However, personal robots will certainly not replace friends; they will be little more than home computers, since their main function is to relieve you of the work you don't enjoy doing.

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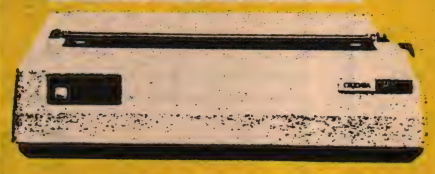

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Robot Hero 2000
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with a non-zero checksum, no acknowledgement is sent, causing the line to be retransmitted.

The Remote Console is divided into two sections: the remote logic and the transceiver circuit. Let us look at each of these. (One set of these units is also located in the robot to form the other end of the RF link.)

The basics of the remote logic is shown in Figure 4 (page 70). The "heart" of the circuit is an MK3870 8-bit microprocessor that is used to scan and debounce the keyboard, read/write data from/to the LCD display (80 characters on two lines), communicate with the serial port, transfer data to and from the transceiver, operate the WAIT (LED) indicator, and perform start-up diagnostics on itself and the LCD module.

The CPU contains an ALU (arithmetic logic unit). 4096 bytes of ROM holding its operation algorithm. 64 bytes of RAM, a programmable timer, and has a 4 MHz crystal-controlled clock oscillator.

When power is first turned on, the CPU is reset by D1 and C1 connected to the CPU reset pin.

C1 is initially discharged, and an internal pullup resistor within the CPU causes the capacitor to charge performing reset. Diode D1 ensures that when the remote is turned off, C1 is rapidly discharged.

Three bits of port-0 are fed to a 1-of-8 decoder causing each of its eight output lines to go low one at a time, with each output feeding a different column of the keyboard matrix. When a key is depressed, the corresponding row line also goes low. Port 1 of the CPU permits the CPU to detect which key is depressed. A two-key rollover is provided and the LCD has its own CPU.

A 555 timer is connected as a 1-kHz a stable oscillator. The positive-going output is applied to the D2-D5. C2-C4 charge pump to generate the negative voltage required by the RS-232 port. One transistor converts the incoming RS-232 signal to the TTL level required by the CPU, while another transistor converts the TTL-level CPU output to the required RS-232 output levels.

The third transistor drives a small transducer to provide an audible click when a key is depressed.

A −5 volt regulator accepts the −12 volts and drives the contrast control for the LCD display.

Power to this circuit is from a rechargeable battery driving a 5 volt regulator. An external power-line driven charger maintains the battery charge.

Transceiver Circuit

Data inputs and output of the CPU are fed to the transceiver circuit shown in Figure 5 (page 151).

When the CPU calls for receiver operation, it turns on Q1. When this happens, the Q1 collector goes low thus turning on Q2 which supplies operating power to a 5 volt regulator that feeds the 75 MHz receiver. Q2 also supplies voltage via R1 to PIN diode D6. When this diode conducts, the whip antenna is coupled to the receiver input.

When the CPU calls for transmitter operation. Q1 is cutoff and Q3 is turned on. When this happens, Q7 applies power through choke RFC to the transmitter module. At the same time, this voltage turns PIN diode D7 on, allowing RF to reach the whip antenna via capacitor C5.

While the transmitter is turned on, incoming data from the CPU is applied to Q5 which in turn keys Q6 on and off in step with the 1s and 0s of the data.

Each time Q6 is turned on, it removes the operating voltage from the transmitter module. Thus, the transmitter RF output is gated by the digital data. With PIN diode D7 turned on, the packets of RF are coupled to the whip antenna.

To allow the receiver enough time for its AGC cir-

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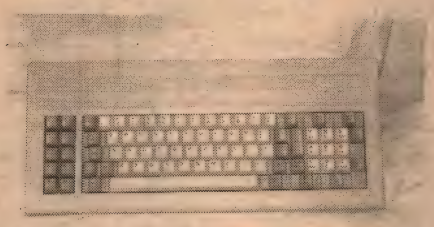

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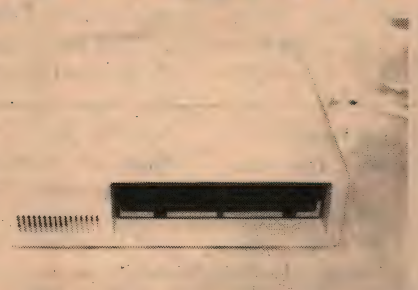

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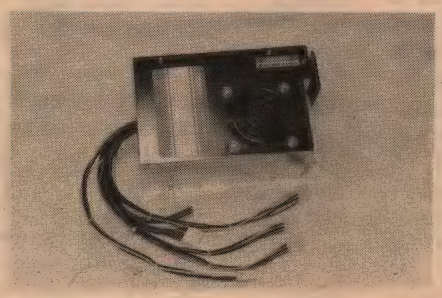

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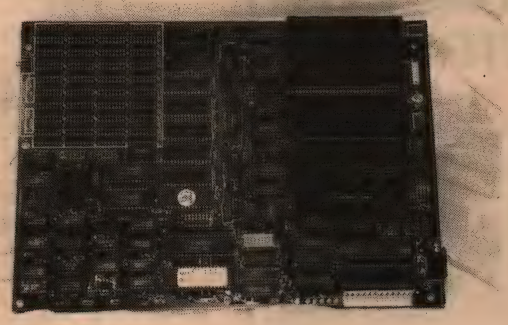

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Robot Hereo 2000 continued from 155

cuit to settle down, the CPU begins each transmission with a 300 millisecond string of "sync" characters (7 ms of carrier followed by 3 ms of no carrier). This provides the same average level of a typical transmission, and the sync characters are ignored by the receiving CPU.

Sonar Circuit

The basic sonar circuit is shown in Figure 6 (page 70). This system is controlled by an 8042 UPI (Universal Peripheral Interface) that contains a CPU, ROM, RAM, and I/O. A program within the ROM controls the stepper motor (which is mounted on the head of the robot), adjusts the gain of the sonar receiver, times and controls the frequency of the sonar pulses, and determines target range.

The CPU drives a motor driver IC that, in turn, supplies the correct sequence of power to the four motor windings to make the motor rotate as required. The motor drives a shaft that carries the sonar and light "mirror" protruding through the top of the robots head (in which is mounted one sonar transducer), and also drives a slotted optical disc. The optical disc is used to determine where the "mirror" is aimed.

The closest object that a sonar can track is primarily determined by the length of the emitted ultrasonic burst. When the sonar is first turned on, it transmits a burst consisting of four cycles of 50 kHz. This allows detection of an object as close as 4-inches away. However, if no object is detected within 20 inches of the robot, the UPI then causes the ultrasonic generator to create four different ultrasonic frequencies.

The use of four different transmission frequencies allows a better resolution of true range. Thus, the UPI controls a burst generator and receiver that allows automatic generation of 8 cycles of 61.5 kHz, 8 cycles of 57.1 kHz. 16 cycles of 53.3 kHz, and 24 cycles of 50 kHz.

The pertinent ultrasonic signal is amplified, applied to a set-up transformer, then passed to the transducer selected by the UPI-driven electronic switch. (A second sonar transducer is mounted in the base of the robot.)

As the time echo increases, the UPI increases the gain of the receiver. When the received signal has a high enough amplitude to switch the associated voltage comparator, this applies a stop signal to an incrementing counter within the UPI. The digital "word" stored in the counter becomes the target range.

Other Senses

The basic sound, light, and temperature sensors are shown in Figure 7 on page 70.

External sound is picked up by a condenser microphone mounted on the top portion of the robot, amplified, and passed to the system via an A/D converter.

A light-dependent resistor is mounted adjacent to the sonar transducer at a rotating mirror on the head. This signal is applied to a unity-gain amplifier, and passed to the A/D converter. The two diodes at the output of this circuit keep the output of the op amp from going above or below the voltage limits of the A/D converter input.

Temperature is measured by a semiconductor sensor having a temperature coefficient of 10 mV/degree C. This signal is applied to an op amp having a gain of 10 and applies it to another input of the A/D converter. Once again, a pair of diodes keep the op amp output voltage within the A/D input safe limits. ●

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C/128— CP/M Column

by Cheryl Peterson

My mail has been pleasantly surprising. Like other CP/M users before you who've had useful information, you have jumped forward to extend a helping hand and I appreciate all the assistance you've offered. You've given me plenty to think and talk about this month, so let's just dive right in. As you'll see in this month's column, I intend to make sure that the information gets passed on to everyone who can use it.

But first, I have run across another book on the C-128. This one is a doozie; the SAMS *Official Book for the Commodore 128 Personal Computer*. While it contains just about as much information as the user guide, it offers little for your $12.95. And much of the information is outdated and/or incorrect. For instance, Commodore shelved the 1572 dual disk drive months ago, but the book recommends it. They also recommend *BYTE* and *INFOWORLD* for more information on CP/M when both of these stopped giving CP/M much attention over a year ago.

They have a list of magazines they recommend which doesn't even mention *Computer Shopper* and we've faithfully covered Commodore products as long as they've been available. But that's not all. They recommend *Compute!* (a general computer magazine), instead of *Gazette* which is aimed exclusively at Commodore users.

There are almost no programs for illustrative purposes. They recommend the CP/M version of MultiPlan (expensive) when there is a perfectly good version running under 128 mode that is actually a better product. (I may be a CP/M elitist, but even I recognize that it isn't always the best choice.)

They also mention and recommend Dbase, giving no contact for Ashton-Tate. We'll get to the fallacy of this when I go over my mail later. Stay tuned.

The book's only redeeming feature, as far as I could see, was that it recommended three other VERY good books by SAMS that deal with CP/M. They are the *CP/M Primer*, *Soul of CP/M* and the *CP/M Bible*.

I guess if this were the only Commodore 128 book in town and you could get it for $10, it might not be a total waste.

Not New, but maybe New to You.

An outfit in Oregon, *Spite* Software has been supporting CP/M software for a number of years now and many of the programs that they sell may be suitable for the C128 since they sell both Kaypro and Osborne format. They have a whole catalog of software, some of which is available from them, some from third parties. They have a toll-free number from which the catalogs can be ordered, 800-824-7888 Operator 311. It's up 24 hours a day. They also have a technical support line for questions about any of the products, 503-224-0137.

I've used some of their products, including the Writer's Assistant, and have found them to be very good. When I've talked with their representatives, they have always been very helpful.

Mail Call

Barbara Durham of Ohio writes to tell me that the CP/M update is available from Gary Eide for $5. She says that she found out about it through the CP/M SIG of CompuServe (a great source of PD software and general information by the way). She gives Mr. Eide's address as:

Gary Eide
N84W28452 Center Oak Rd.
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I followed this letter up with a phone call and found out that Mr. Eide is indeed offering the disks. In addition to the files necessary for changing the operating system, he is giving many public domain software programs, including IMP and two versions of MODEM7. With these three programs most people will be able to get onto public BBSs or other telecommunications media, via the Commodore 1670, 1650 or 1660 modems. He is also putting programs like NULU, SWEEP, RXLABELS, VDE,

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Probots and People continued from page 154

In business, industrial robots will certainly be very important in a number of different industries, especially automobile manufacturing. Office and retail work, along with warehouse management, are other good areas for robots to relieve humans of dull, repetitious work that may also be dangerous.

It's a lot of fun to see what's happening with robots now and imagine what they will be like in the future. However, there will be outside effects, both positive and negative, because of the personal robot which we should also be prepared to accept.

The Effects of Personal Robots

As more robots enter the home and industry, how will labor react? Will labor unions fight the introduction of these machines or welcome them as an essential element to the United States economy? What will happen to maids, babysitters and guards? It's apparent that technological unemployment will occur because of robots, but it's also important to remember that those displaced by robots will find other jobs, never before available, that are less dangerous and tedious than the work they had before. The new jobs in robotics, other high-technology fields, and space and sea exploration will employ tens of thousands of those who formerly worked on auto assembly lines and cleaned up homes.

The effect of the personal robot on individuals is also questionable. It is difficult to predict if humans will begin to treat robots as "one of the family" or as simply a mechanical appliance that happens to resemble a human being. Moreover, the question remains as to whether people will tend to grow lazy if robots take over more and more manual labor. In addition, will criminals begin to use robots to do their dirty work, thereby eliminating much of the risk involved in stealing or other illegal acts? One thing is certain — if there are going to be robot robbers, there will be robot police to chase them around.

No one person has complete control as to where any technology is going to take us. However, what we can do in the present is the only thing that really matters. With this new and exciting field ahead of us, the best thing you can do is learn what you can about personal robots, educate yourself through experience by actually using the machines, and contribute what you can to the field by creating positive uses and ideas for personal robots. With all of the excitement that can be created with something like this, the upcoming years are going to be dynamic and eventful. I, for one, am looking forward to them. ●

Inside Commodore continued from page 72

had *TREMENDOUS* interest in a hard disk system for the C-64 and C-128. Next month, we are going to be reviewing not one, but TWO new hard disks for the C-64/128.

We'll be looking at the JCT 1000 drive. This is a new 3.7 Megabyte hard drive that's software upgradeable to 5 Meg. The price, $695, is much more affordable than any previous hard disks for Commodore systems. We'll also be reviewing ICT's new Data-Chief system. It's a 10 Meg. hard disk system with a built-in 1541 floppy drive for $895. Be sure and tune in for all the details!

The Wild (And Sometimes Wooly) World of Telecomputing

For those of you out there who still haven't taken the plunge and gotten our Commodore VIC/64/128 on-line with a modem and communication software, maybe you'll consider it after you read this month's featured topic. While telecomputing may not be for everyone, it certainly is overlooked by far too many users who could benefit by it. Hopefully, after reading this article, you'll have a better understanding of the subject. If you've ever wanted to "get connected," but didn't know where to start, I'll try to point you in the general direction. The rest is up to you.

By the way, if you are looking for an excellent reference guide to the entire world of telecomputing, I can recommend Alfred Glossbrenner's book, *The Complete Handbook of Personal Computer Communications*, 1984, St. Martin's Press. He goes into much more detail (over 300 pages worth) than I possibly can in this one article.

The Hardware: Modems and Interfaces

When selecting a modem for your Commodore system, there are several general considerations to keep in mind. You will have to decide what baud rates (or speeds) you intend to run, what advanced features (if any) you want, whether you will ever use your modem with any other type of computer, and, most importantly, how much money you are willing to spend (the sky, as usual, is the limit).

I think the initial consideration should be whether you want a Commodore-style modem (for use with a Commodore computer only) or if you want an RS-232 interface, stand-alone modem. (I call the former type, a **Commodore-specific** modem.) Commodore-specific modems are usually less expensive, but stand-alone modems have their advantages, too.

Commodore-Specific Modems

Commodore-specific modems are designed to plug directly into the User Port found on the VIC-20, C-16, Plus/4, C-64, and C-128. Commodore has made several modems of this type, including the 1600, 1650, 1660, and 1670. Third party clones of the Commodore modems are also available, sometimes with more features for the price. Some popular third party Commodore modems are the Westridge and Might-Mo.

Don't confuse the term **Commodore-specific** with **direct-connect**. While Commodore modems plug directly into the User Port, direct-connect usually refers to the telephone line interface, not the computer interface. Direct-connect modems hook directly into the modular telephone plug of the phone system and avoid the acoustic couplers found on older style modems. Both Commodore-specific and stand-alone modems are available as direct-connect to the phone lines.

Stand-alone Modems

Stand-alone modems are designed as generic peripherals that will interface with any computer using a true RS-232 interface. If you decide on one of these modems, you'll have to buy or build a User Port to RS-232 interface (like the one presented in this column several months back).

While they require an interface card, stand-alone modems have features not available on some Commodore-specific modems. Stand-alone modems also work with many other types of computers. If you ever want to use the modem on another brand or type of computer (an Amiga, for example), you should probably consider the stand-alone type modem.

Baud Rates

Modems are designed to run at various speeds, which are measured in baud rates. The baud rates roughly translates into the number of characters per second (CPS) that can be sent or received by a modem, divided by ten. That means a 300 baud modem is capable of approximately 30 CPS speed

continued on page 168

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20 years experience in the mail order list business.

MiAmiga File
continued from page 72

entire file is loaded into memory at one time. No indexing is done.

The maximum length of any one field in a record is 64 characters, and a record may contain up to 32 fields. Depending on memory and disk space available, a file may contain as many as 32,000 records.

Two main windows are used in MiAmiga File, the List Window and the Form Window. Default on startup is the List Window.

The first thing to do with any database, of course, is to lay out the format, i.e., tell the program what each piece of data is and where it goes.

This is done in MiAmiga File by defining columns while in the List Window.

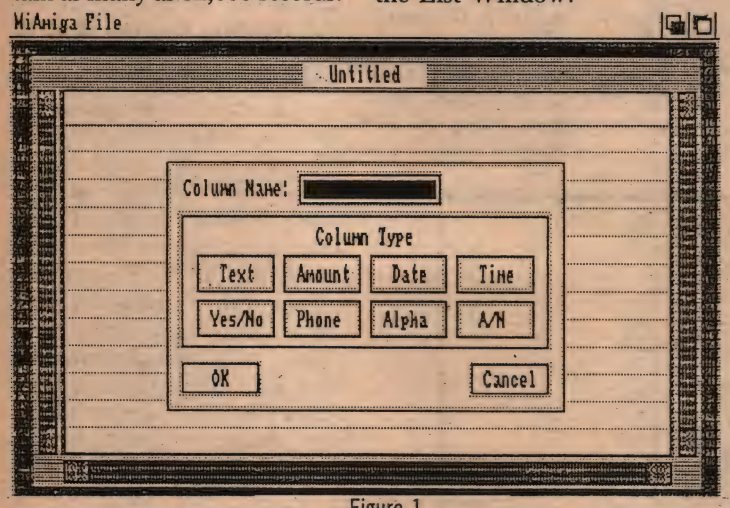

Figure 1
Column Initialization

After selecting "New" from the File menu, the next step is to select "New" from the Column menu. This brings up a window where certain information about the new column is entered. (Figure 1)

First is the Column Name, heading. Next, for Column Type, the type of data desired for this column must be specified.

Eight data types are allowed. Taking them in the order they appear on the screen, we have:

Text: This one will be used most often, because it accepts all letters, numbers and symbols. This is the one you would use, for example, in an address field which usually contains a number.

Amount: Accepts numbers and decimal points as well as dollar signs, commas and up to two decimal positions.

Date: Accepts dates entered in standard MM/DD/YY format.

Time: Time is entered in HH:MM format, AM or PM. If entered in military format, time is automatically converted to AM or PM.

Yes/No: Used for Yes or No responses. Entering only a Y or N will result in MiAmiga File completing the remainder of the entry.

Phone: Accepts parentheses, hyphens and a period as well as digits, as in (800) 555-1212.

Alpha: Accepts letters and spaces only.

A/N: Accepts alphabetic and numeric characters and spaces.

The column type is selected by clicking in the appropriate box, then clicking on "OK." If the desired box is highlighted, it is only necessary to click "OK."

This procedure must be followed for each column (or field) in the database, and I consider it to be a flaw in design, although minor. Rather than going back and dragging down the Column menu and selecting "New" for each column, it would be much more convenient to have a requestor ask whether you wish to define another column, then simply click on a "Yes" or "No" box. Computers, after all, are supposed to do the work.

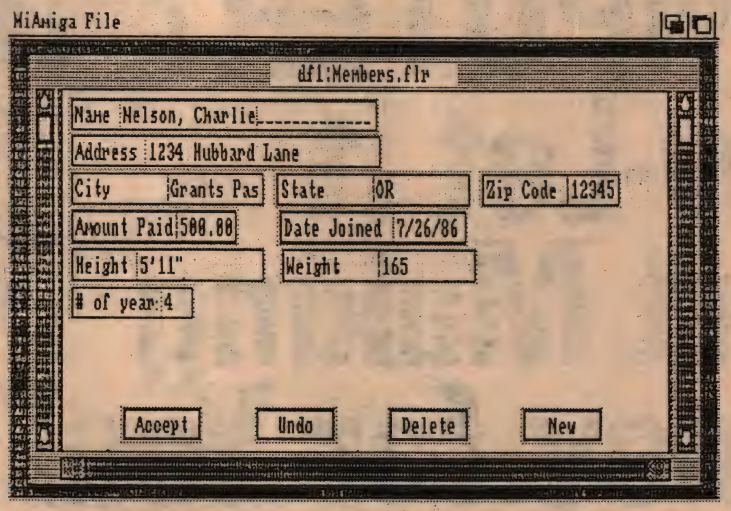

Figure 2
Form Window

After a column is defined, it appears in the List Window in the order of definition. When the first column is defined, faint vertical lines appear on the screen to separate the columns, giving the screen somewhat of a spreadsheet look.

If, after the columns have been defined, it is found that an item would perhaps fit better in a different position, it is unnecessary to redo the column. Columns may be moved from one position to another by dragging with the mouse.

Also, it will be found in many cases that columns are not of the proper size for containing a data item. Column size may be adjusted to a larger or smaller size by placing the mouse pointer on the vertical line marking the right boundary of the column, holding down the left mouse button, and dragging until the desired size is attained.

In most cases, all columns will not be visible on the screen. A scroll bar on the bot-

continued on page 163

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Low-Cost 64C
continued from page 71

cluding italics, bold, outline and shadow, each in different point sizes. Users can display several fonts and sizes on the screen at the same time.

GEOWRITE is a true WYSIWYG (What You See Is What You Get) processor with features not previously available for a low cost computer.

GOEPAINT is a bundled graphics editing program that gives users a wide array of painting and design tools. It offers such features as pencil draw, paint brush, area fill, or air brush. It can draw straight lines or circles or reproduce from 32 pre-drawn patterns. The user can also create new patterns. Art created in GEOPAINT can be used with text from GEOWRITE to create presentations or page layouts.

Commodore 1802 Monitor

One of the benefits in using GEOS rather than the normal C-64 DOS is the ability to the run the 1541 disk drive at increased speed. There is a 15% increase in speed obtained with the 1541 drive using GEOS.

The QuantumLink network has been established by Commodore to maintain contact with its users and to provide a link between Commodore users. The 64C computer will come bundled with a software package that enables Commodore computers equipped with a disk drive and a modem to access the QuantumLink network. The modem is a peripheral which is not part of the computer and must also be purchased in addition to the computer and disk drive. ●

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Well the answers were quite exciting. The system is so well engineered you can install it yourself. With the cables we send you, you simply plug it into your RJ11c modular outlets. You connect the telephones to the KSU with the same type of standard plugs. In other words, if you can plug in your present modular phone, you can install your own 510KT or 206KT business phone system. The phone system includes self-diagnostics in the uncommon event that the system needs repair. And repairs are a simple matter of board swapping. You may even want to do it yourself.

Features are easily programmed by a single key telephone set. You don't have to be a computer wizard. The user gets sensible, easy to use features and has the flexibility to change the data-base station, and to change restrictions without rewiring or calling for service.

When you consider the people behind the system, you'll be even more interested in the **510 KT**. The researchers and engineers combine over fifty years experience in the telecommunications industry from the most respected labs in North America: Bell Lab, Bell Canada, Northern Telecom and CDC. The manufacturer build PABX and PCM systems, and other high-tech products. Perhaps best known among them is the monitor for the IBM PC (for which they earned IBM's Zero Defect Award). The **510 KT** is backed by a one year warranty on all equipment manufacturer defects. Emergency replacements are provided, but there's not much chance you'll ever need one.

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–data base change by a single key set
–flexible extension number assignment
–power failure backup
–power failure transfer
–volume control
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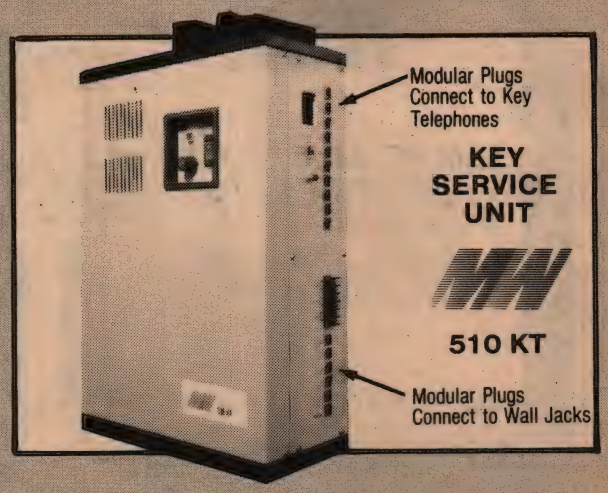
–private line
–last number redial
–abbreviated dialing
–toll restriction
–night service
–switch-hook flash
–music on hold
–on hook dialing
INTERCOM CALLING
–call forward
–call pickup
–call waiting
–audible signal indicating called party busy
–station paging
–talkback to paging station
–two intercom links
CENTRAL OFFICE AND INTERCOM CALLING
–line status indication
–distinctive ringing
–hold
–exclusive hold
–i-hold
–hold recall
–privacy
–monitoring
–do not disturb
–three-way conferencing
OPTIONAL FEATURES
–zone paging via external speakers
–speaker phone
–hand free talk back
– (SMDR) time/date/# called/duration recording (optional)
–call message display
–time of day display
–stop watch for call time
–directory of abbreviated dialing number display
–feature operation display
–dialed number display
–canned message content display
–adjunctor converting POT set into 510 KT compatible set
SPECIFICATIONS
Central Office line capacity: 5
Intercom link: 2
Key sets capacity: 10
Input power: AC 110V 50/60 H_z
Power consumption: 40 watt
Cable: 6-wire, Star Connection
Dimension & Wt: 17" x 12.5" x 5.5" 22 lbs.
Operating temp: 32-104 degrees F



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MW 206 KT

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System diagnostic indicator
Data base change by a single key set
Flexible extension number assignment
Power Failure memory backup
Power failure transfer
Volume control

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Hold
Exclusive hold
I-hold
Hold recall
Privacy
Monitoring
Do not disturb
Three-way conferencing

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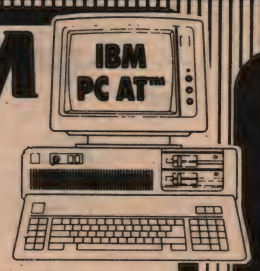
IBM



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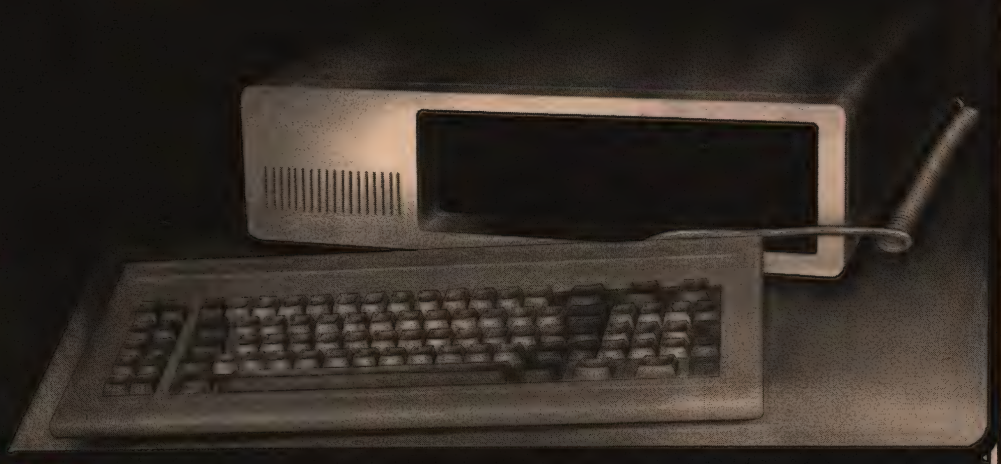

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MiAmiga File continued from page 158

tom moves the viewport horizontally through the file.

A column name and/or type may be chaned, if no records have been added to the file, by selecting "Change" from the Column menu after first having clicked in the box at the top row of the column. The same dialog box will appear that was used to initially set up the columns.

If records have already been added, the only way to make the change is to add a new column, transfer all the information from the old column, then delete the old column.

Once a database has been defined, the user is ready to start adding records. Data input is done in the Form window, accessed by clicking on Form in the Options menu.

Figure 2 shows the Form Window just after a record has been entered. On first entry to Forms, however, the field blocks will not be so neatly arranged. Rather, they will appear one above the other, in a single vertical column.

This is one of the better features of MiAmiga File—it allows you to arrange the fields any way you wish in the Form Window. This not only allows for attractive layouts, but is necessary if you wish to print out mailing labels. The positions may be arranged whenever necessary, and whatever arrangement is present when a file is saved will be preserved.

Be aware, however, that adding or deleting a column will make it necessary to re-arrange fields in the Form Window.

The scroll bar on the left of the window is for use when all fields are not visible on the screen. Placing the mouse pointer on the arrow at the bottom of the bar and clicking will make remaining fields visible. The scroll bar on the right is for moving through the file one record at a time.

Entering data is very easy with this program. First make sure you are at the beginning of the record. If not, use the left scroll bar to the top of the form.

The first part of the field contains the field name. The second part is where the data goes. Simply type in the proper information and press Return when finished. The program will move to the next field.

When satisfied that all entries for the record are correct, place the pointer in the box marked "Accept" at the bottom of the screen and click. Or, if you are in the last field of the record, simply press Return.

Note that ACCEPTing a record does not mean that it has been said; it is in memory, but not on the disk. To save records permanently, one must go to the File menu and select "Save."

MiAmiga File has a few shortcuts to make data entry faster and easier.

While in the Form Window, going to the Options menu and selecting "Auto Capitalize" causes the first letter of each word to be capitalized as the data is entered.

As mentioned before, typing Y or N in a Yes/No field causes MiAmiga File to fill in the remainder of the field. Pressing Return or Tab automatically inputs a "Yes" response.

In a Date field, single digits may be entered for a month or day portions, but two digits *must* be entered for the year. If slashes are left out, they will

continued on page 176

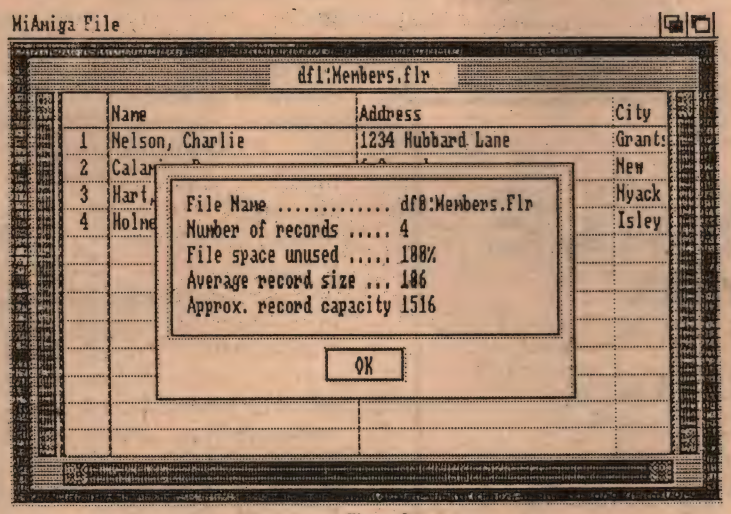

Figure3
File Info Superimposed Over List Window

MacUniverse continued from page 76

The old program was called INFO.BIN. It gave the user direct access to the time, date and volume settings via a pull-down menu. It was a stand-alone program that had to be run to be used. The new version is called INFO + 3.0b and is an INIT Resource that must be installed in your system file with RESED. Once installed it becomes memory resident.

Using INFO + 3.0b gives you the following features as a pull down menu: (1) a clock; (2) an alarm clock; (3) the current date; (3) displays the current sound level; (4) displays the current RAM cache setting; (5) setting a task timer; (6) display the current disk space used and available on each volume; (7) display the current amount of memory available; (8) launch an application program; (9) black out the screens; (10) lock the menus; and (11) open a desk accessory file. Additionally the parameters of items 1 through 5 can be changed from INFO + . The control panel does not need to be accessed.

To use INFO + you will need two files. They are INFDOC.WRT and INFPLS. BIN. They are both found in DL1 under PPN 75726,3541. This program is shareware so you should send $10 to the author if you decide to keep it.

Companies Listed In This Column

People in Places — Suggested price $59.95. Data & Information Software Company, Suite 200, 100 Bush Street, San Francisco, CA 94104. No phone number given.

MacMemories — Suggested price $39.95 per diskette: Index $5.00. Imageworld, Inc., P.O. Box 10415, Eugene, OR 97440. 800-457-6633.

MaxThink — Suggested Price $89. MaxThink, Inc., 230 Crocker Avenue, Piedmont, CA 94610. 800-227-1590. 800-642-2406 (California only).

Pattern Breeder — Suggested Price $39.95. Mac America, 18032-C Lemon Drive, Yorba Linda, CA 92686. 714-779-2922.

HFS Locator Plus — Suggested Retail Price — $24.95 (Locator does start with a "L"). HD Back-up — Suggested Retail Price — $49.95. PBI Software, Inc., 1111 Trinton Drive, Foster City, CA 94404. 415-349-8765.

myDiskLabeler — Suggested Price $44.95. William & Macias Microcomputer Products, Spokane International Airport Business Part, P.O. Box 19206, Spokane, Washington 99219. 800-752-4400. 509-458-6312.

MacSpec — Suggested Retail Price $199.95. LM Software, P.O. Box 93, Belmont, CA 94002-0093. 415-594-0627.

Copy II Mac — Suggested Retail Price $39.95. Central Point Software, Suite 100, 9700 SW Capitol Highway, Portland, OR 97219. 503-244-5782.

INFO + 3.0b. Stored in Compuserves DL1 database as INFDOC.WRT and INFPLS. BIN. They are both found in DL1 under PPN 75726,3541. ●

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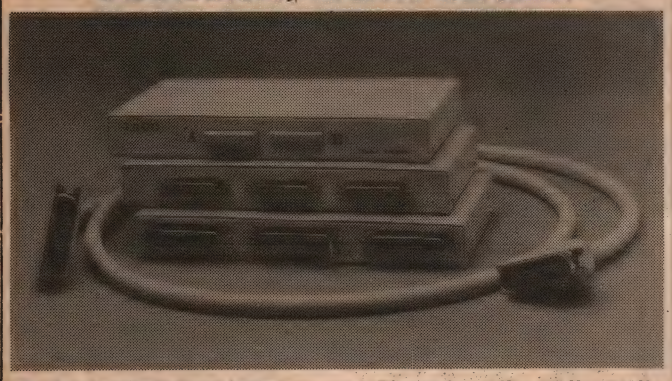

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VIP Professional-Integrated Software for Amiga

by Ervin Bobo

We read and hear so much about the "power of the Amiga" that the phrase, while true, is certainly overworked. Truthfully, the Amiga is not powerful by itself, tending to sit demurely on your desk until you awaken it with Kickstart and then feed it an application that (another of those phrases) "unlocks the power."

VIP Professional is one of those programs that allows your computer to flex its muscles. If it were necessary to describe VIP in a single sentence, we'd have to say that it is Lotus 1-2-3 with color. And that is without any "ifs" "buts" or "except fors." The program is so much like Lotus that you could go to a bookstore, buy any of the numerous books written to expand on the applications of Lotus, and apply everything in it to VIP—including the keystrokes.

As such the workings—if not the name—of the most popular productivity software in the country have finally come to the Amiga. Now power users have a place to come to and the professional complainers who have described the lack of such software for the Amiga can fold their tents and slip away into the night.

Just in case you've been isolated from computer talk for the past several years, VIP—like Lotus—is a combination spreadsheet, database and graphing utility. Put your labels and numbers on the spreadsheet, crunch them as you will, sort them on any field and then turn the numbers into any of several business graphs.

If that sounds like a lot for one program to do, it is. This is why it requires 512K and why you are left, out of all that memory, with a worksheet of about 60K. VIP causes a lot to happen in your computer and it happens quickly, due to a programming technique called overlaying.

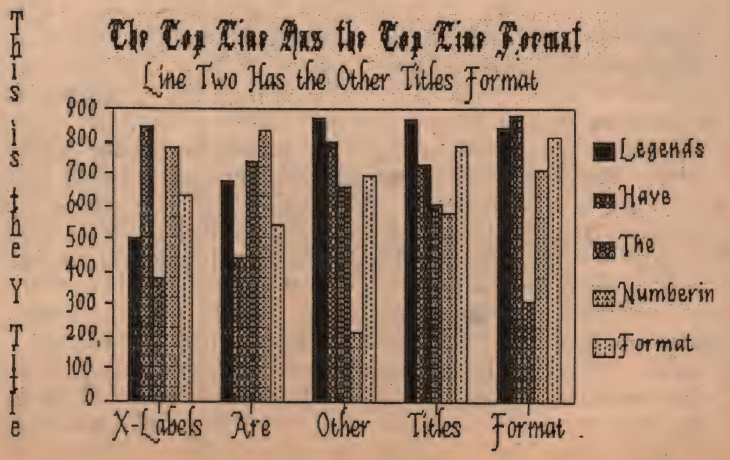
Now, 60K is enough for a very large worksheet, but whether you attain that number depends on how you load the program. In my case, with the 5.25 inch drive connected, I was left with only 25K. Still enough for a good worksheet, but not enough to run all the tutorials and demos included on the master disk.

With drive DF2: (no matter what it is) disconnected, you load Workbench, set your Preferences, close the Workbench window and load VIP. With a single-drive system, this involves some disk swapping; with one external drive, put Workbench in DF0: and VIP in DF1:. Open the VIP window, click on the icon and you'll be told how much RAM is available. Now you're ready to go.

Although VIP uses Intuition interface, the memory requirements preclude multitasking. The documentation recommends expanding RAM to at least 1 megabyte for such an application and both the Tecmar and Cardco memory expansion units have been tested and have been found to work well. With the Cardco interface, VIP will support up to eight megabytes.

You're presented with a worksheet, the columns designated by letters, the rows by numbers. Combined, these coordinates indicated the absolute address of any cell on the sheet—A1 is the cell in the top left corner and one step to the right is B1. Now move down, using the cursor keys, and you are at B2. In all, VIP will allow you to create worksheets of up to 8192 rows and 256 columns, giving you a possibility of more than two million such cells. (With, of course, sufficient memory.)

continued on page 172



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RS-232 Inteface for Commodore.

For additional information contact Omnitronix, Inc., P.O. Box 43, Mercer Island, WA 98040; (206) 236-2983.

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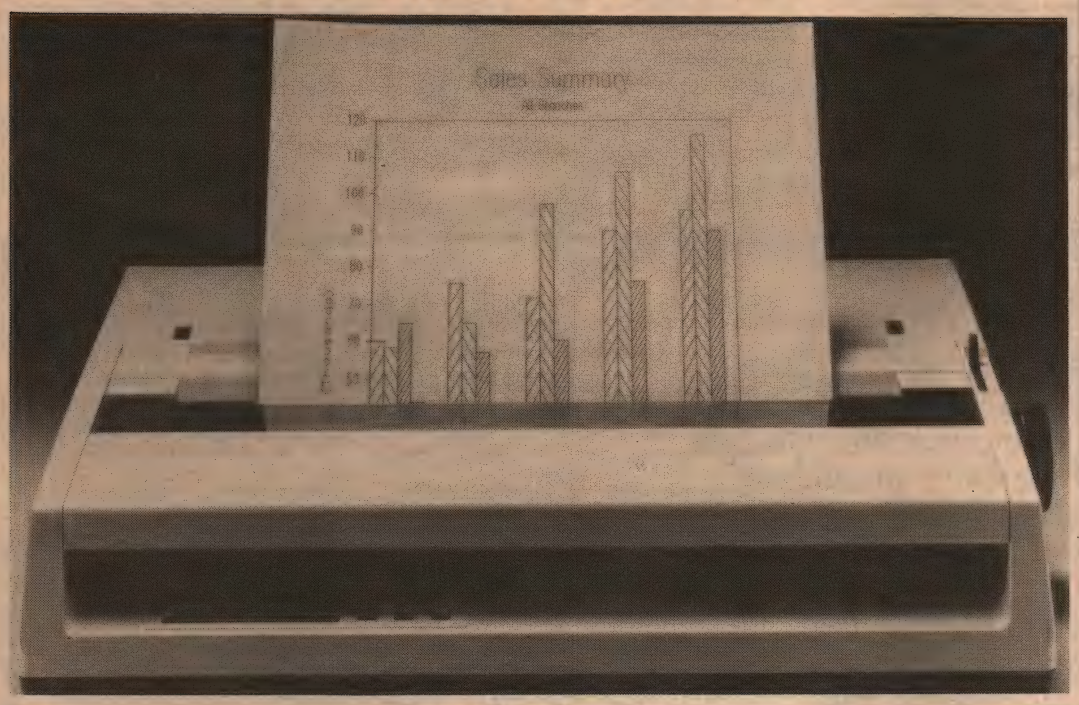
Okidata 120 for Commodore

The Okidata 120 dot matrix printer now offers near letter quality capabilities to Commodore home computer users.

Compatible with several Commodore computers, including the 64, 128, SX64, Plus/4, 16 and VIC 20, the Okidata 120 has a suggested retail price of $269.

The feature-packed workhorse Okidata 120 prints bidirectionally in draft mode with short line-seeking logic at 120 cps. It is rated at 60 cps in the enhanced mode and produces excellent near-letter-quality (NLQ) text at 30 cps.

The Okidata 120's "long life" nine-pin printhead—capable of printing 200 million characters—is among the most durable in the industry. It prints 80 columns with standard characters and 137 columns with condensed characters.

Standard features include a Commodore character set (upper and lower case), characters with true descenders, double width characters, condensed characters, vertical spacing at six and eight lines per inch, and a Commodore graphics character set.

The Okidata 120 also offers friction and pin feed paper handling capabilities, all-points addressable graphics, Commodore block graphics, emphasized and enhanced print, superscripts, subscripts and underlining.

The mean time between failure rating of the Okidata 120 is 4,000 hours, while the mean time to repair is 15 minutes. The printer comes with a supply of computer paper and an interface cable.

All these big-printer capabilities are packed into a sleek, 8.8 pound printer package taking up just one square foot of desk or print stand space. The Okidata 120 offers a one year warranty on parts, labor and printhead.

The Okidata 120 is available through most popular retail outlets. Commodore users can locate the nearest Okidata retailer by calling Okidata's toll-free hotline, 1-800-OKI-DATA.

For additional information contact Okidata, 532 Fellowship Road, Mt. Laurel, NJ 08054; (609) 235-2600.

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C128-CP/M
continued from page 156

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While he is offering the disk for $5, you might want to include a sticky-label with your name and address on it, just to make it easier for him. After all, he is making the offer as a public service. Please also include whether you have a 1541 or 1571 disk drive. He'll try to include as many programs as he can, but since the single sided drives don't have as much space, he'll have to cut out some of the programs for the 1541 disks.

Thanks for the lead Barbara!

Help From The Kaypro World

Steven Sanders of the Tampa Bay Kaypro Users Group writes to let us know that they are offering their public domain CP/M disk to us. $10 per disk for those in the US, $12.50 for foreign orders. They are also offering a complete catalog listing all the disks available. Just send a blank disk, a reusable disk mailer and return postage and they'll get a copy out to you.

Mr. Sanders mentions that their user group is the second largest Kaypro group with 2,500 members worldwide. I'm sure he meant this information to reassure us that they are not a "fly-by-night" organization, but that makes me curious who the largest Kaypro group is. Anyway, here's another good source of CP/M PD programs for us.

Here's A Fellow With A Problem

William Jennings of NY writes with a problem and I think I might be able to help. Some of you may be dealing with a similar situation. Data transfer from one program to another is sometimes a very complicated maneuver. Compound that with trying to go from one computer to another and you are really in the soup.

It seems Mr. Jennings' in-laws were doing genealogy work on a Commodore 64 and when their power supply developed problems they "upgraded" (and I use that term loosely) to an IBM PC compatible with a hard disk and more memory. Now the problem is how to get eight Commodore-format data disks over to the IBM format. Having read about C64TOCPM program in another issue, Mr. Jennings was curious to know if this program could be used to change the disk format.

Mr. Jennings didn't mention if he had a C-128, but since he asked about using a program that only runs on the 128, I expect he must have one. Unfortunately, this program is not going to solve his problem. Believe it or not Mr. Jennings, the IBM MFM format is not used by the PC or compatibles. Even if it were, though, C64TOCPM is used to transfer program files. Though it may well work for data files, it would take forever switching between the two modes to get all that data moved.

There is a way to do it, however. Get the IBM and the C-64 in the same room together. Preferably on the same desk. (If the C-64 is gone, a C-128 can be used in its place.) Besides the two computers, you will need a terminal package or modem software running on each of the two computers and a null modem cable to connect them. I would suggest using an RS-232 module on the C-64's user port and connect that to an RS-232 port on the compatible.

You must match the software so that each computer understands the other. You are, in effect, turning these computers into terminals. You then use the terminal software to transfer the files from one machine to the other. I would recommend using a program that supports XMODEM protocol, since this is a standard that many software manufacturers recognize. There are PD programs like ProComm for IBM compatibles that support this protocol. Most good Commodore software does, but you need to be sure the Commodore software will address whatever port you are using to transmit the data. Also be sure that the software will make a connection with another computer without using a "ring detect." Many terminal packages are dependent on sensing that the "telephone" has rung before they will try to connect. Obviously this software would be unsuitable for a direct connect situation, where the phone isn't going to ring.

Once you've got the machines set-up and the software programs loaded, you must use the software to get the two computers talking to each other. Once the connection is established, you just transfer the files. The IBM will automatically save the files to its own disk format. You'll have to check the individual software package to know what commands are used to initialize a transfer and write to disk.

The other alternative to this process is to use a modem on the C-64 and a modem on the compatible and call up using the phone and then do the transfers. While this ties up your phone lines for a while, tranfer software that is designed to be used with telephones and modems will be easy to find, and in many cases, easier to use.

Hope this is helpful to both Mr. Jennings and some of you other readers. Thanks for the question, Mr. Jennings.

Last (but not least) Letter

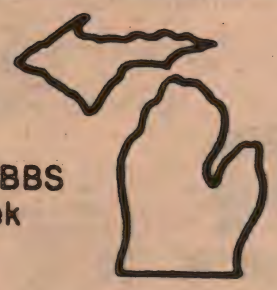
Mr. Joseph Levine of Virginia has a lot to say in his letter and I admire his willingness to help out. He brings up some points I'd like to expound upon. (Hope you don't mind Mr. Levine.)

First, he mentions the prob lem of switching between Kaypro IV and Kaypro II modes when reading software. As many of you have probably noticed, when the 1571 senses it has a Kaypro format disk it needs to know whether it is IV or II. It assumes that you have a IV disk inserted and asks at the bottom of the screen "KAYPRO IV?"

If this is correct, you may press RETURN and the procedure will continue. If this is not correct use the left and

continued on page 173

AMIGA



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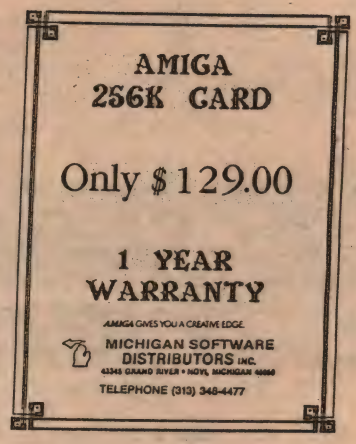

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Inside Commodore continued from page 157

(by comparison, that's about as fast as a Commodore datasette). A 1200 baud modem runs at 120 CPS or about four times faster.

Right now, the most popular baud rates for microcomputer modems are 300, 1200, and 2400 baud. When you buy a modem, it will usually run at slower baud rates, too. For example, most 1200 baud modems will also run at 300 baud. The 1200 baud modems are quickly becoming the most popular and can be had for almost the same price as 300 baud units. The 2400 baud modems are still considerably higher priced.

The speed at which you use your modem can run is also determined by the BBS or information service you are accessing. You'll find that 300 baud is almost universally supported, but gradually on its way out. Most BBS systems support 300 and/or 1200 baud modems, but some still run 300 only. The national information services usually run 300/1200 with somewhat limited access for 2400 baud modems.

If you're accessing a BBS over long distance, or a national information service where you pay by the minute of connect time, a faster modem can save you money. The only catch is that some national information services try to make up the difference by charging you more for the 1200 baud rate. (Some services, like Delphi and GENIE, have dropped this surcharge.)

If you are on a limited budget, and only want to occasionally access a local bulletin board, you will probably do just fine with 300 baud modem. On the other hand, if you want to access the national services and do a lot of file up and downloading, then the 1200 baud modem is probably the best choice. You'll easily save the higher cost of the 1200 baud by using less connect time.

If money is no object, and you want the fastest modem you can get, then try one of the 2400 baud variety. You'll have to buy a stand-alone model, though, because no one makes a Commodore-specific 2400 baud modem, yet. You'll also need special communication software, since the KERNAL doesn't handle 2400 baud very well.

Bells and Whistles: Can You Live Without Them?

Modems, like computer terminals, can be divided into two categories: dumb and smart. Dumb modems are also known as manual answer/originate modems. That means, everytime you use the modem, you have to manually do the dialing or answering and connect it to the phone line. The Commodore 1600 modem is an example of this type of modem.

Smart modems, on the other hand, can connect and disconnect themselves from the phone line, dial numbers, and automatically answer the phone when it rings. This type of modem is usually called an autodial/answer modem (or simply autodial). Commodore has made three types of modems like this: the 1650, 1660, and 1670.

In order for you to take advantage of all the features of a smart modem, your communication software has to be properly configured for them. The better communication programs will have a dialing directory, auto-redial on busy signal, and other such niceties. In the Commodore world, there are only two smart modem configurations that you need worry about: the 1650/1660 and the 1670/Hayes Smartmodem.

The 1650/1660 Modems

The 1650 and 1660 are autodial/answer Commodore-specific modems that run 300 baud. The 1650 was introduced as an upgrade modem for 1600 users and is found in many BBS systems today. The 1660 is supposedly 100% software compatible with the 1650, but is a little less expensive to produce, and thus replaced the 1650.

There have been some slight incompatibilities noted between the 1650 and the 1660 (but you probably won't run into them unles you are setting up a BBS or running a Plus/4). If you are buying a third party Commodore-specific smart modem, you should make sure that it's 1650 or 1660 compatible, in order to take advantage of it's features through software.

The 1670/Hayes Smartmodem

The 1670 modem is also an autoanswer/dial modem, designed in a Commodore-specific configuration, that runs at 300 and 1200 baud. Although it's not a stand-alone unit, the 1670 is actually software compatible with one of the most popular stand-alone

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whatever font and size that has been chosen from the menu. Text can be plain, bold, italic, outlined, underlined or combinations thereof. These seemed to work just fine with my Cardco interface and RX-80. Because the text occupies different space depending on the attributes, you don't choose characters per inch. Rather you choose size using a point scale similar to that in typesetting. Correspondingly, margins are set using inch designations instead of characters across.

The editing features are nothing new; insert, delete, cut and paste, automatic word-wrap at the end of lines. To use cut and paste, you must highlight the section of text you wish to work with. Put the cursor at the beginning of text to be worked and press the joystick button. Pull the dark highlighter across the text until the whole section is dark. Then release the joystick button. Pull down the menu and choose the appropriate option; replace, delete, change font, cut into the text scrap, or copy into the text scrap.

To paste the text scrap in, go to the place where it is to be inserted and select paste from the edit menu. Using the text scrap, it is also possible to move sections of text from one document to another. You can also take pictures created using GEOPAINT and put them into your documents. A complicated procedure, but definitely liveable for someone with the need.

Although you can force a page break, there is no facility to automatically number pages. There is no header or footer command. No center text functions. In other words, this is a very primative word processor, unsuitable for any professional applications. But fine for most home use.

GEOPAINT

This looks much like Amiga Graphicraft or MacPaint and has most of the same features. Again, there are small differences in the feel of it. With a Mac, the drawing mechanism is active whenever the button is pressed. With GEOS, you must press the button once to activate drawing, again to turn it off. If you forget to turn it off, you get stray lines all over the place.

You draw with a pencil, erase with the eraser, paint with a brush, fill sections with a faucet, spray paint with a hose, or draw with squares and circles. You can incorporate text using several of the GEOS fonts and styles. You draw a box for the text to fit in and then type the text. The program arranges the text in lines according to how many letters can fit across the box. The box can be resized at will.

A pixel edit mode is provided for fine details. You must leave edit mode to move to another area of the screen, but this only takes a second or two. There are also edit commands like, invert, mirror, copy, rotate and move. These functions are performed on previously designated sections of the picture.

One especially nice feature is the patterns that can be used to fill areas. These can save hours of drawing. Also, the paint brush can be redesignated as one of about 20 different pixel patterns, from a circle to a box to a slanted line or a single pixel point.

All in all, the paint program is fun to play with. It is limited to black and white and pictures created with it cannot be written out for use with other packages that don't run under GEOS.

My printout of the drawing I created looked fine except for the definitely unround circles. They seemed to lose something in the translation. This is definitely a hi-res printout, by the way.

Conclusion

There are certain limitations to working with GEOS. It will not run programs that are not native to it. Although you can start them up by opening them as files, the program merely hands you off to BASIC and then executes a run statement for the appropriate filename. So you lose all the desk accessories and file controls.

Don't look to take things from documents written with other word processors or graphics from other drawing packages. As far as I can tell there is no way to do this yet. Maybe in a future update.

Last but not least, the disk is copy-protected. You can make copies and they highly recommend having more than one "work disk," the original being saved only to boot the system. No backup disk is provided or offered. Bad policy there guys. According to the documentation, if something should happen to your disk, you can erase the files on it and then copy all the files from one of your work disks and it should work. To a hacker, I'm sure this suggests a way to break the copy-protection. Since I'm not an expert at that sort of thing, I would question my ability to restore a trashed master disk.

For those who can live with its limitations, it will suit them fine. There are always those who want simplicity at all costs. For them, GEOS is ideal. For others who have a great deal invested in word processors and graphics packages, there is little here to justify the purchase, even though it is only $59.95.

GEOS, Version 1.0
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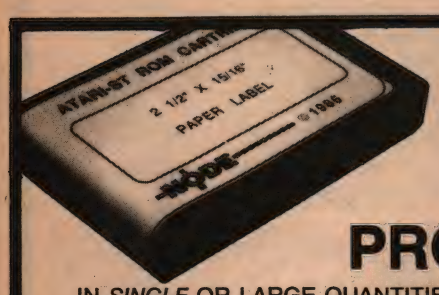

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Amiga Workbench continued from page 72

appropriate to what you are now doing.

Scribble is available from Micro-Systems Software, Inc. at 4301-18 Oak Circle, Boca Raton, Florida 33431. Designed to run in 256K of RAM and with a single drive, the suggested list price is $99.95 and this includes free updates as well as customer support through a toll-free number and through the company's bulletin board.

It is not surprising that Scribble contains so many features that make it easy to create telecommunication text files, since this is the same company that produces Online, an extremely good terminal program.

Public Domain Programs

The nature of this software is that it tends to fill in the gaps left by the large software publishers. What publisher, knowing he can sell the thousand copies of "Return to Planet Zero" at forty dollars a crack is going to waste his time publishing a single-function program called Screen Dump? No matter how badly you need such a program, you aren't likely to find it on the shelves of your favorite software store.

Terminal progams are another matter. While a good terminal program would certainly have commercial possibilities, there was a need to get these in the hands of users more quickly than could be done by the route of publishing, packaging and distribution. As a result they were the first programs of consequence to operate on the boards, for with such software the owners of Amigas could get together quickly and increase their libraries of programs during those dark days of last winter when there was almost nothing on dealer's shelves. Of course, you had to have a terminal program in order to get on-line and download another terminal program and...never mind. It's like discussing time travel or the chicken and the egg.

Another category of programs to be found on bulletin boards we will categorize with the name "Frippery": things done simply because they can be done; initial exercises of those who would test the limits of ABasic or test their own limit as programmers; and "Mind Candy," things to watch on your screen while you have nothing else to do; things to use to amaze your friends; programs you can take apart in order to increase your own knowledge of programming.

In some instances, you can take from a bulletin board items of software as polished as anything you can find on a dealer's shelves. In other cases, the program may have rough edges or need extensive debugging before it will run. These represent the extremes and between them you can find a host of useful programs or routines that you may incorporate into your own programs.

We'll begin by taking a look at Starship Terminal, now in version 2.0 and commonly called Starterm. Written by Jim Nangano and Steve Plegge, this communications program was first available on Delphi and GEnie but has been distributed so widely that you're likely to find it anywhere. Under the heading of shareware as opposed to freeware, the authors ask for a donation of $15.00 from users as a means of financing their continued software development.

Starterm is one of the fancier programs, with a professional look to its pull-down menus and sub-menus. So far as I can tell, it lacks only auto-dial and auto-answer features—most everything else you'd want in a terminal program is here and is accessible through the pull-down menus. And there's the rub.

Though I've received this program from several sources, I've not yet seen a copy with any documentation. Perhaps there is none, in which case Starterm would be recommended only for those who are experienced in the use of such programs and who will not be confused by all the terms used in telecommunication.

For beginners, we'd suggest you buy a copy of Online or Maxiterm. The documentation alone is worth the price.

The same comments and caveats would apply to the Wombat Terminal Program (WTB v2.0), first available on Delphi and on CompuServe. Again, it is a good program but probably not for the beginner.

Screendump 1.1 was written by Ned Konz of Ormond Beach, Florida, who asks that a $10.00 donation be sent by those who are enthused about his program. Working with AmigaDOS programs that allow multi-tasking; Screendump occupies only one line at the bottom of your screen. Because it is cached in RAM, there is no interference with other programs, except that the bottom line of your workscreen will be overlayed by the command bar of Screendump. There are three selection bars to be accessed by the mouse, Help, Print, and Printing. It is as easy to use as anything you've every seen, the HELP

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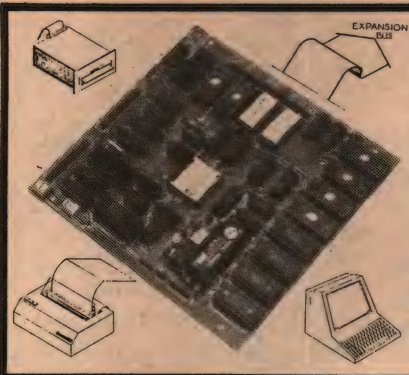

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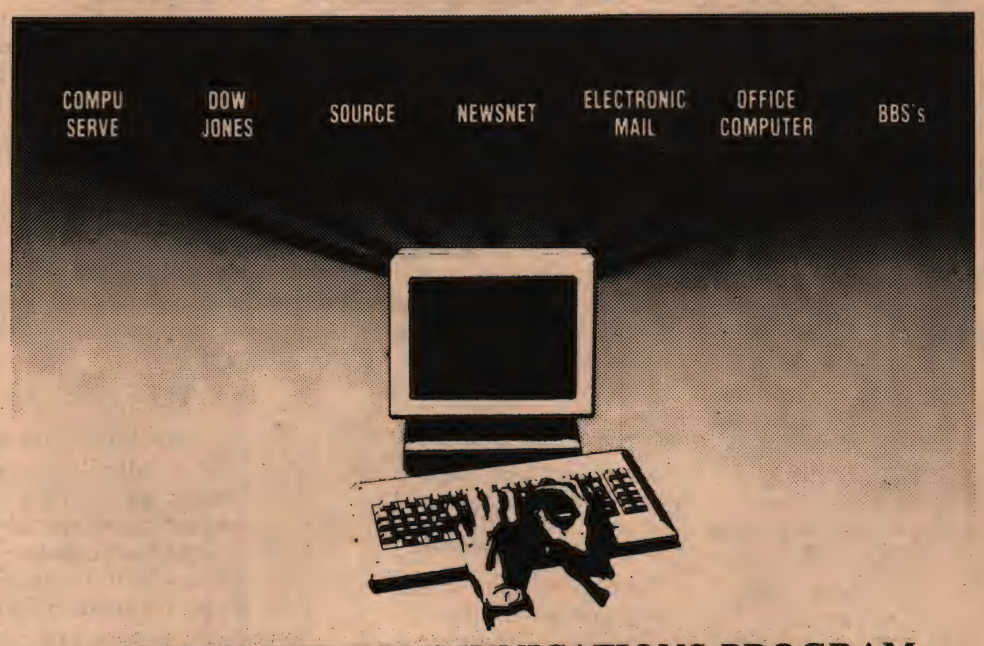

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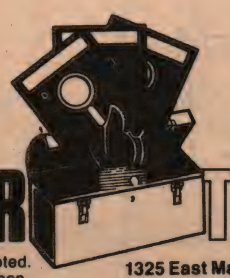

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Inside Commodore continued from page 168

smart modems on the market, the Hayes Smartmodem.

There are also many stand-alone clones of the Hayes modem that cost about the same price as the 1670. If you are looking for a stand-alone smart modem, make sure you get one that's compatible with the Hayes standard (this is also known as the Hayes AT standard). Any modem that's Hayes software compatible should also work with programs configured for the 1670 modem.

Communication Software: Terms and Protocols

After selecting your modem, you will need appropriate telecommunication software (also known as a terminal program or modem program). While there are many considerations in selecting a modem, there are even more when it comes to terminal software.

Terminal programs vary widely as to their features and usefulness. While there are some excellent commercial terminal programs, some of the best are available for free from user groups, information sources, and BBSs. (For new users, this sometimes represents a chicken and egg problem. To get a good terminal program from a BBS, you usually have to have a decent one to download it to begin with!) Here are some ideas as to what to look for.

Dumb vs. Smart

Just as there are dumb and smart modems, there are dumb and smart terminal programs. Dumb terminal programs are minimal versions that simply allow you to get data in and out of your computer over the modem. They don't save any information that is sent from the source on the other end (called downloading), they just display it on the screen. When the screen scrolls, the characters go into digital never-never-land. A dumb program also doesn't allow you to send disk files from your system to the host (called uploading). Only what you type in at the keyboard gets sent. The 1600 modem used to come bundled with dumb terminal programs for both the VIC-20 and C-64 (called VIC-term and 64-Term).

Smart term programs, on the other hand, not only maintain modem communication, they usually also buffer characters received into memory for later saving or printing. They will typically support several protocols for data transmission allowing files to be sent or received systems. When used with the proper modem, they will also support auto-dial, call back, and other features already mentioned. There are several nice smart terminal programs in the Public Domain or distributed as Shareware that have all the features above, so it's rare for anyone to use a dumb terminal program anymore.

Software Protocols

Both dumb and smart terminal programs support a range of communication parameters, called protocols, that are essential for communication to occur. When there is a problem in getting a computer working with a modem, the vast majority of the time it is due to problems with software protocols.

The character transmission protocols involve the baud rate, number of data bits, stop bits, and parity. The modem program will allow you to select these things before you dial your modem and make connection.

Baud rate, already discussed, is determined by your modem type and the host system you are accessing on the other end. Usually, when you call a host system, it will automatically detect the baud rate you are running and adjust itself to it, if possible. If you call a number continually at 1200 baud, only to get garbage on your screen, you may find later that it only supports 300 baud. (The reverse is also possible.) The solution is to try again at a different baud rate.

The other communication parameters can be a confusing array of variables, but fortunately, there is a generally agreed upon standard for most microcomputers. Whatever the baud rate, set the other parameters at 8 data bits, 1 stop bit, and no parity. This will get you through 99% of the time. Some services and BBSs still require other odd ball configurations, so you will have to get them via a voice line or mail to get the specific configuration.

File Transfer Protocols

Smart terminal programs, that allow file up and downloading, also have a wide variety of other software protocols to consider when accessing a BBS or information service. If you are going to up or download software (and not just ASCII text), then you will have to deal with one of the binary transfer protocols. With Commodore-oriented BBS systems, there are two protocols that are generally supported: Xmodem, and Punter.

Xmodem

The Xmodem protocol was first used by CP/M bulletin boards in the late 70s. It was developed by Ward Christenson. Since its inception, it has been adopted by many other computer systems, including Commodore BBSs. Xmodem protocol sends binary files in 128 byte blocks and then sends an error checking checksum or CRC. If the receiving computer detects an error, it requests a re-send for the block. This continues until the file is successfully transmitted, or one of the computers gives up.

Punter

Steve Punter also developed a binary transmission protocol, exclusively for Commodore computers, about the same time as Xmodem. It's not compatible with Xmodem, so many term programs support both protocols. There are actually two Punter protocols, old and new. The old protocol sent data in 256 byte blocks and the new one sends data in 1K blocks. Punter protocol also has error detection and correction, similar to Xmodem.

Other Protocols

There are many other possible protocols available in telecommunication software. There are several other binary file transfer protocols including Ymodem, Zmodem, IMP, and Kermit. I have avoided discussing them because of space limitations. If you need to access a source using one of these protocols, you will have to find special software since most Commodore term programs don't handle them.

Also, there are many special protocols for the C-64 that use color graphics and sound. The Quantumlink system is one of these. Some Commodore BBS systems use a scaled down graphics feature, similar to this. I have also avoided this information. If you are interested in how these protocols work, contact the service involved for more information.

Getting Help (Where to Find the Answers to Your Questions)

As I review reader's mail we receive for this column, it's amazing how similar, and yet different, so much of it is. Readers, many times, are having difficulty with their hardware or software and need advice and help quickly. We try to answer those questions, as time and space permits.

But many times, readers have questions that need almost immediate replies. They can't wait the weeks or months it may take for them to receive a letter back or have their problem addressed in print. While this column stands ready to help all of our readers to the best of our ability, we just can't answer all of your questions in a timely manner. The shear number of requests for help is vast and we just don't have the staff or resources to answer many questions.

Fortunately, there are MANY resources of information and help for your computer (yes, even your Commodore computer). You would be surprised to find out how many people have probably faced the same problems you have, found a solution, and are willing to share the answer with you.

It's much better to have a quick, reliable, source for answers to questions and help with problems. In addition to all the traditional resources of books, magazines, dealers, the local user group, there stands another, often overlooked, source of information: the local Bulletin Board System (BBS).

Talking to the Other Guys

You don't necessarily have to call a Commodore-oriented BBS for help either. You can use your Commodore computer, modem, and software to contact computer owners who use other systems altogether, like Apples, Ataris, or even IBMs. For C-128 owners running CP/M, you might be overwhelmed by the amount of help (and good software) you can get from RCPM BBS systems!

By observing a reasonable amount of etiquette and good manners, you can find a lot of other computer users who are more than willing to help you with general problems that you may be having with printers, diskettes, or even software. I know of an IBM BBS system who even set up file exchange directory for Commodore users. Don't overlook accessing a foreign BBS as a means of reaching out to a knowledge pool beyond what you find on a Commodore BBS.

If you find that one foreign BBS is not very accepting of you as a Commodore user, then don't get discouraged, there's probably another one not too far away that will accept you with open arms. Just forget the number of the bad one and try again!

You can also forget a lot of the confusing jargon you may have heard about communication software, protocols, and up/down loading. If you are primarily interested in getting help and just communicating with other users, the actual modem and software you use is, to a large degree, unimportant. Just find the right baud rate, set your protocol to 8 data bits, 1 stop bit, and no parity (unless advised otherwise) and start calling.

Numbers Please!

By now, hopefully, the only thing holding you back is getting the numbers of all those great BBS out there waiting for your calls (right?). Well, dear reader, you are holding in your hands one of the best resources for accessing hundreds of the best BBSs across the USA. That's right, the *Computer Shopper's* famous BBS listings. (Look under the main table of contents listing "Other" for "Bulletin Board.")

In case you've somehow missed them, every month we publish an updated listing of public BBS all across America, that's already sorted by area code for your convenience. All you have to do is decide how far away you want to call and look up what's available in your area. Once logged onto some BBSs, you'll probably find listings of numbers that we somehow missed, too.

Reading Our BBS Listings: Some Helpful Hints

A lot of newcomers (and

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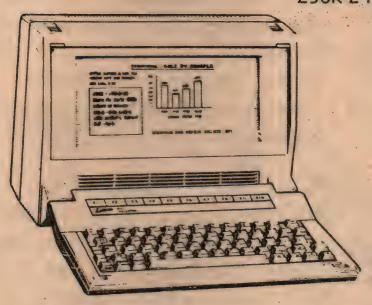

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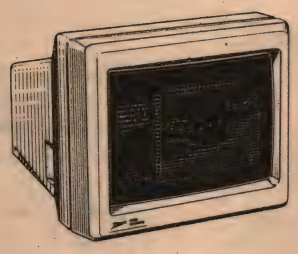

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VIP Professional

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Just above the worksheet, an information block keeps you current as to where your cursor resides and any information you type into that cell is displayed in that block until you enter it by pressing return or the cursor key.

And when you return to that cell—even weeks later—the information block will display the contents of that cell. So, if you see a total and wonder how in the world you came up with it, check the information block for the formula you used.

That block also displays menu choices, as well as a brief explanation of each item in the menu. Press "/" at any point and the main menu appears. The cursor is resting on the "Worksheet" entry and just below it you are told that this selection invokes worksheet commands. Select it by pressing Return and the menu changes to show the commands you can use and the results of each command.

All of this happens in the blink of an eye, without need for disk access, so if you're still wondering where your RAM went, at least some of it is accounted for.

Which brings up another point. Those who may have used Lotus are probably aware that it consumes only about 200K. But you should also remember that the various routines of Lotus are on four 360K disks and that the only way to use everything quickly and effectively is to install these disks on one hard drive. By contrast, everything in VIP—including GraphiPrint—is contained on just one 3.5 floppy. While you can install VIP on a hard drive, it is already built for speed and any gains in that area would probably be slight.

Okay, you've sped through the creation of a worksheet and now you want to turn the numerical information into a graph. Fine. First, call up your menu and select Graph. Your first choice is for the type of graph and you may choose from Line, Bar, Stacked Bar, Pie, etc. Then specify the X range—for labelling—and next the range of numbers with which to work. If, as an example, column C contains sales total by month, you'd specify C1..C12. Press Return to enter it, then press Return again to confirm your choice by having VIP highlight the included cells from your column. Then press View and, after a brief disk access, your chart is on the screen.

Now return to the menu. Assume column C held totals for 1983 and you need a comparison with subsequent years. Put the 1984 range in B, 1985 in C and press View. Assuming you've been working with a bar chart, each month now shows three bars, shaded for separation, allowing easy comparison. And, with the Options selection from the menu, you can select Color for an even clearer look.

Or, if you want a presentation-quality graph, you may save that information to a graph file—".gph" filename extension—and later load GraphiPrint and call up that file.

It is only in GraphiPrint that you use Amiga controls—remember Lotus was never made for a mouse—but by using the mouse here in pull-down menus you can create graphics of stunning color, any sixteen out of the Amiga's possible 4,096. To do this, you have as a pop-up requester the same type of palette as in the drawing and painting programs for the Amiga, and slider bars allow you to adjust each of the default colors to your own personal taste.

In addition to this, you have at your disposal all the Amiga fonts—the ones familiar from Notepad—for labelling and legends and while there may be little business sense in labelling a bar chart with sixteen-point Sapphire, there is no denying that it is a sure attention-getter.

Such charts may be printed, of course, as can the less spectacular charts made by the VIP main program, and if you have a color printer capable of printing on acetate, you can make transparencies for overhead projectors that are sure to be show-stoppers.

As a database, VIP may be just a little different than what you've seen before, for the fields of your record are laid out right to left instead of top to bottom. As an example, a name would appear in column A, the address in B, state in C, zip code in D and so on.

Used in this way, however, it becomes very easy to locate the field on which to sort. Select Data from the main menu and you will first be prompted for the range you wish to sort. In the above example, assuming we had five records with only the four fields per record, our choice would be A1..(the dots mean "to") D5. After pressing return to enter your choice, press it again and the selected range will be highlighted, allowing confirmation before proceeding.

Now select the range by which to sort. If it is name, specify A1..A5. Once again, highlighting will confirm your choice. Now go back to the menu and select Sort. Don't blink or you'll miss it.

Such a sort would have been made using the Primary Sort key. There is also a Secondary Sort option which allows finer control. If, for instance, you wanted those names in order but grouped by state, then state would be Secondary.

When using VIP as a database, each cell becomes a field: holding one item of information such as an address or zip code. And since the number of available cells does not change, it is possible to build a file containing as many as 8192 records, with each record containing as many as 256 fields (items) of information.

With all this going for it, you'd think VIP would have run out of disk space. Not quite, for there was ample room to include several tutorials; several games that are advanced tutorials; and even an explanation as to why the

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C128-CP/M
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right arrow keys to scroll through the format names until the right one comes up. Using RETURN indicates the right format name. Pressing CONTROL and RETURN simultaneously, locks in that format choice and the 1571 will assume this is correct for the rest of the session.

In case you're curious about why the problem arises, the Kaypro II uses only the top of the disk. But the data format is the same on both machines. With one important difference; the location of the directory tracks. The II version has the directory on side one. The IV version has the directory on the other side. The 1571 is a smart drive, but it needs to know where to look for the directory tracks.

Mr. Levine was kind enough to let me know that in some of the early manuals this information is left out. He also points out that if you have a friend with a 1571 disk drive, it might not be necessary to buy one of your own. Using programs like SWEEP and WASH to transfer programs from any format to Commodore GCR format makes it possible to use these programs with a 1541. All you need is a willing partner who has a 1571 you can use for a few hours. Of course, you'll have a lot less disk space on the 1541 compatible disks since you can only use one side.

He also asked how folks can tell which version of the operating system they are using. If you have the new operating system the opening sign on message should indicate a date in December of 1985. The old system is dated August 1985.

Great Point!

Mr. Levine has brought an IMPORTANT fact to my attention and I will have some very philosophical comments to make in a second. It seems he called Ashton-Tate to purchase a copy of dBase II to run on his 128. I'll quote from his letter here:

"3. Speaking of dBase II. I wrote to Ashton-Tate requesting information on how to purchase a copy of dBase to run on my 128. They replied that not only do they not sell a version for the 128, they do not PLAN to sell a version, nor do they sell ANY 8-bit versions for any computer anymore. Considering the main complaint of software publishers about piracy is that it reduces sales of legitimate products, how will Ashton-Tate prosecute CP/M pirates? I guess they will argue that if you really want to use dBase II, you should purchase a PC and dBase III."

As anyone who has read more than a few of my articles can attest, I abhor the practice of piracy. I think it robs hard working people of their honestly earned income. But this is a case where I could almost condone it.

Before any of you jump on me, this is the point where the philosophy comes in. For those of you who couldn't care less about copyright and piracy please skip down to the next topic heading. Those who'd like to see me take potshots at Ashton-Tate, read on.

Contrary to what the large corporations in this country would have you believe, copyright laws were not enacted to fill their coffers. Early in history, we had an agrarian culture. Most of the citizens were simple farmers and they created most of the necessities of life on their farms. A few specialized talents were recognized and those who had necessary skills survived by trading their skills for the necessities.

Progress was slow and innovations in farming, social structure, medicine and education were hindered by the need to make a living. Illiteracy was common (even today it remains a problem) and the literary arts suffered because they lacked a profit motivation. Since reading was rarely profitable most people didn't see a need to learn it and creating reading material was even less profitable. Especially in an atmosphere where anything written could be readily reproduced and distributed. As printing presses flourished, more and more valuable information could be distributed.

But there was no profit to be made by the author of the work. Since anyone could reproduce and distribute his work without his knowledge

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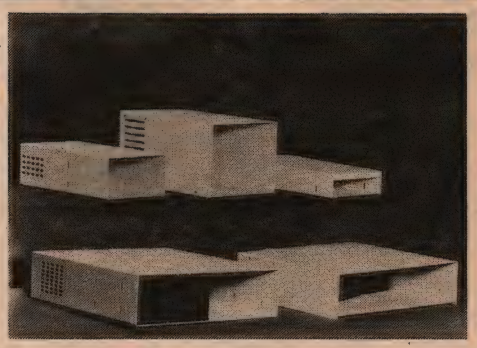

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Amiga Workbench continued from page 169

screen telling you how it will print depending on the paper size you've selected in Preferences. And speaking of Preferences, it is a good idea to set your Graphics Mode for Black and White. The default is Grey Scale and in printing the blue Workbench background, you can go through a printer ribbon mighty quick.

Speechtoy 1.1 is a frippery by David M. Lucas. Occupying only a small window it packs a lot of power, allowing the use of slider bars to control speed and pitch; icons to select between male and female voices; a tiny face that will mouth the words spoken by your Amiga; and a translation of your message into phonemes, visible in a "Times Square" line at the bottom of the window. It will, however, process only a very short speech: one line, about ten syllables.

No collection of public software would be complete without one or more versions of Othello, probably the most ubiquitous computer game of all. The version I have is not credited, but is extremely well done. The playing field is green and orange squares; you place your pieces by clicking on a square; and a column at the left edge of the screen reminds you when it's your turn as well as confirming the number of pieces captured by each move. There are two levels of play, and even the easy level is a good contest.

Dynamic Triangles by Earl Hamner is a piece of mind candy or "video wallpaper." With a menu of several selections, you choose which triangular shapes you wish to see, then watch as they move about the screen, leaving trials behind and changing shading, until at last you have a moving abstract. A simple program, but very colorful.

Toybox by Robert Sawdey, is more mind candy. Here, a colorful menu allows four selections of shapes that move and change colors. Choose lines, boxes or triangles and the end result is very close to the abstracts of the previous page.

3-D Image Plot System was originally written by Tom Hudson for the Apple computer and has been translated to the Amiga by R. Grokett Jr. With a library of several shapes done in a 3-D CAD style, you can choose to view or edit. If viewing, you select the x,y,z coordinates from which you wish to view. Prompts lead you through these choices, as they do through the choice of how many degrees to rotate and how many degrees of rotation in each step. Though the author admits he has not tapped the full power of ABasic, he does point out that this program runs many times faster on the Amiga than on the Apple.

As an example, you can choose to view his rendition of the Space Shuttle, watching as it rotates through three dimension until you've seen it from every angle.

Brickout by Wayne Davidson, brings that familiar game to the Amiga. The execution is good and the action escalates as you get into the top rows of bricks. Should you clear the screen, your only reward is to try again. Though you are allowed thirteen balls, your points are averaged on the scoreboard and you must compare averages rather than total scores if you wish to now how good you are.

Kwikcopy by Dave Davenport is just what it sounds like, a disk copying program. While it seems no faster than the diskcopy routine of Workbench, and while it does not purport to copy protected disks, it does report on errors it finds on those disks, perhaps providing a clue to DOS mechanics.

DPSlide by Paul A. Biondo is a program that allows you to take separate images or drawings stored in the IFF format and combine them into a continous slide show in the version I have, several of the demo paintings from DeluxePaint and one or two digitized photos were strung together to demonstrate the capabilities of the program. It is possible to go from one image to another by wipes, fades or "pop ups" and could be valuable to anyone who needs a looping demo.

Should you copy this from a bulletin board, be sure to also copy the .doc file that goes with it, for this provides the several pages of documentation necessary to use the program as well as the address and phone number of the author, who expresses his willingness to help you over any rough spots.

From Casa mi Amiga come several interesting items. One of my favorites is Eagle, a looping demo of what seems to be digitized black-and-white photos of an eagle in various altitudes of flight. Through skillful use of animation and sequencing, the uncredited author has the eagle swooping through the skies against a backdrop of misty mountains.

Ballerinas is a disk containing several oil studies of ballerinas at work and in repose. You saw at least one of these in almost every Amiga article published last fall. The oil studies have been digitized, preserving the moodiness of the originals, and can be a nice way of showing off the resolution of your Amiga.

The last two disks are not, properly, programs. While the source is a bulletin board, I'm not sure this code can be downloaded. (My copies came through the mail.) Both require Kickstart v.27 and if you don't have that (it didn't come with your machine) it can be ordered from Casa.

For those of you who have never been on a bulletin board, I hope the preceding gives you an overview of the kind of things you can find there. With the possible exceptions of StarTerms and the Wombat Terminal Program, there are very limited commercial possibilities for any of these: would you really want to pay forty dollars to watch a triangle make patterns on your screen, or to watch a short looping eagle routine?

Probably not, yet there are values and worths that cannot be measured in commercial terms and, to one degree or another, each of the above programs share some of those worths. So what do you do

continued on page 176

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Inside Commodore
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even old timers) who haven't been around since the beginning of telecomputing, might be a little confused by our BBS listings, so I'll try to clarify the subject a little. First of all, as I mentioned, the listings are all in Area Code order. It's done this way so you can decide how far away you want to call. If you are wondering the general location of where a BBS is, the best way to correlate the number is to use one of the Area Code maps that are often found in the front of phone books. When you are a real BBS freak, you'll probably even tape one of those maps to the wall by your computer for reference.

As you noticed, many BBSs have weird names selected by their Sysops (system operators) like 'Joe's Digital Junkyard" or something picturesque like that. Unfortunately, that tells you very little about what the BBS is all about. Like whether it's an Apple-oriented system, a Commodore system or what.

Most of the time, along with the name, you will see a cryptic abbreviation that is also part of the name like RCP/M, CBBS, ABBS, or TIBBS. Those abbreviations are little acronymms that tell you the general type of BBS that you are calling. I've included a list of the most common of these acronyms in Table #1. Armed with this information, you should be able to find a compatible BBS that can help you with just about any problem you face.

This article isn't designed to be an exhaustive reference on modems or BBSs, just a start. Hopefully, we've helped some of our readers who've thought about getting on-line, but have held back for some reason. One caution is in order though, while finding help, making aquaintances, and up/down-loading software on a BBS can be fun, once you get started, it's usually addictive. You may find that receiving the monthly telephone bill is quite a sobering experience, and your spouse may recommend selling the modem and/or computer to help raise the necessary funds. Remember, you were warned here first!

Parallel Printer Driver (PPD) Disks and Cables Now Available

For those who missed the June issue, the new version of PPD, the parallel printer driver, is now shipping. PPD is a printer driver program that provides complete software support to drive any Centronics (tm) parallel interface printer through the C-64's User Port. With PPD and the appropriate cable, you can drive any parallel printer as though it were a standard Commodore serial device.

The PPD driver contains many selectable features found in other Commodore printer interfaces including "PETSCII

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MiAmiga File
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be filled in automatically.

Data about the file may be obtained at any time by going to the File menu and selecting "Status." A dialog box like that in Figure 3 will appear.

Printing is done is two different ways.

Mailing labels are printed from the Form Window. Data fields must be arranged by means of dragging that any information to appear on the labels will be contained in the first five lines of the Form Window. Any data which is not wanted on the labels must be placed somewhere beneath the fifth line.

MiAmiga File will print only the first 30 characters of each of the five lines.

The second method is to print a report from the List Window. Here, the columns will print out in the same order in which they appear on the screen.

Any data which is not desired in the report may be "hidden" by first clicking on the column name at the top of the column, then going to the Column menu and selecting "Hide." Each column hidden in this manner will be "grayed out" on the screen to indicate that it will not appear in the printed report.

If there is an Amount field in the record, MiAmiga File will total it at the end of the report.

With either of these two methods of printing, the choice is availale for sending output to a printer or a disk file.

MiAmiga File provides two methods for selecting groups of records from a file, termed "choose by example" and "choose by range."

While too complex to explain fully here, "choose by example" uses the operators " = ", "<>", "<, ">", "<=", ">=" and "*" to set up selection criteria. You may opt to either "Include" all records meeting the criteria you have set up, in which only they will appear, or "Exclude" in which case only records *not* meeting the criteria will be listed.

"Select by range" is the second method for choosing groups of records. For instance, you might wish to locate all customers who have purchased items with a value between $500 and $600.

This option also has the Include and Exclude feature.

Two methods of sorting are provided in MiAmiga File. The Single column Sort will sort a filed in ascending or descending order. To sort fields within fields, a Progresive Sort must be used.

Using the Progressive Sort you could, for example, do a primary sort by zip code, then sort names alphabetically within each zip code.

As stated at the beginning of this review, MiAmiga File falls short of being the equal of some of the powerful relational databases available for other computers—but then, it never claimed to be their equal.

Many computer users have need for a simple, easy to use yet reasonably powerful database, yet do not need all the capabilities of the big relational databases. Nor do they need to spend the money for a large, complicated database system if another program can adequately fill their needs.

MiAmiga File will fill the needs of many Amiga computer users very well, and it's reasonably easy on the pocketbook too.

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Amiga Workbench
continued from page 174

with a good program that has no commercial value? You hang on a bulletin board and call it freeware or public domain.

For those of you who have spent your computer lives hanging out on bulletin boards, all the above is something you already knew but maybe enjoyed looking at it in a fresh light. It may even be that you wrote one of the programs and that, for the first time, a national publication is recognizing your work.

However it may be, the following represents my latest list of Amiga bulletin boards. Like all such lists, it is subject to change without notice: User Group boards are volatile; the number may change as a new member takes over the operation; a board with little to offer may perish for lack of interest.

There are others, of course. Bulletin boards are a good source for learning about other bulletin boards, as is the bulletin board section elsewhere in this magazine. If you haven't been on-line yet, get there.

Next month, we'll take a look at Amiga DOS and, hopefully, new software from Aegis and Electronic Arts. Until then, so long. (No, I refuse to say Adios, Amigas. Good grief!) ●

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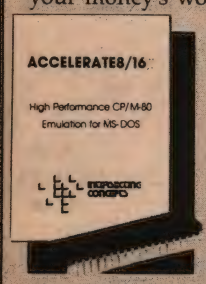

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C128-CP/M
continued from page 173

and consent, where was the motive for creativity? This limited the creative fields to those who were independently wealthy. The copyright laws were an attempt to compensate authors while providing society with maximum access to useful information.

These laws were never intended to be used to deprive the public of access to information. The profit motivation was used to encourage creative endeavors and thereby benefit society. The recently changed copyright laws expanded the author's ownership from 28 years with one 28 year renewal to the life of the author plus 50 years. This was to ensure that the author's descendants had clear title to their inheritance.

Copyrights held by corporations fall under the same principles. Without a profit motive, corporations would have no reason to develop or improve products. But their profit motive is supported by copyright in order to foster the good of society.

The copyright laws were enacted to encourage maximum development and distribution of information that benefits everyone. When the copyright expires, material falls into the public domain and may be freely distributed by any publisher. If a publisher buys the rights to publish from an author, the law provides that when said publisher declines to continue publishing the work, it falls back to the original author. Even if the author sold all rights in the work. This is because copy right laws are intended to promote publishing of infor mation.

How does this reflect on Ashton-Tate? I leave you to draw your own conclusions. For me, I think if Ashton-Tate is reluctant to distribute the software they should either pass the publishing rights to a smaller publisher who can make a profit by distributing it without the great overhead necessary for a software publishing giant, or Ashton-Tate should put the program into the public domain as a gesture of good-will and thanks to the many CP/M users who made their company large enough to be able to walk away from the 8-bit world without even looking back.

::getting down off my soapbox:

Alternatives to dBase

There is still a way for those who scorn out and out piracy to be happy with a CP/M database program. Buy something else besides dBase II. Two good database packages that I've tried on the 128 are PCFile and Filebase. PCFile is a Shareware product (marketed by the now semi-famous Mr. Jim Button of Buttonware). Mr. Button had his initial success working in CP/M. Like Ashton-Tate, he grew into PC-and MS-DOS machines and his programs grew with him. Like Ashton-Tate, he stopped writing new programs for CP/M machines after his initial success with the IBM and compatibles. Unlike Ashton-Tate, his company still offers its 8-bit product.

PCFile can be found in public domain libraries all over the country and it is there legally. Mr. Button was one of the first to use the concept of Shareware. You get the program through a friend or local user group. Use it. If you like it and want to continue using it, you're asked to send $35 or whatever you feel is appropriate for the amount of use you will get from the package. With their 8-bit product, no support is provided whether or not you send money. Share ware is a nice concept that has been gradually catching on.

You can probably get a copy from your local CP/M user group or through FOG. (First Osborne Group)

FileBase

EWDP Software is a relatively small outfit in Indiana. They are constantly striving to improve their product and expand their market. Like many of the big boys, they support the 16-bit computer market. Unlike the big boys, they haven't forgotten the 8-bit market. Tom Markowitz, president of EWDP has done has best to upgrade and improve FileBase in both its incarnations.

FileBase is a fine little database manager. Not too complex, yet flexible and powerful. The latest release, 6.0, is $125. A lot less expensive than dBase even if you could buy it.

EWDP is providing FileBase on Kaypro IV-format disks, so you'll need the 1571 disk drive to run the software. For serious work like database management, I can't imagine using the 1541.

Addresses:

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Inside Commodore
continued from page 176

to ASCII" conversion, BASIC LISTing mode, Hex Dump diagnostic mode, and a transparent mode for hi-resolution bit graphics. A feature unique to PPD is a built-in 8K interrupt driven print buffer.

The May/June issue of *INFO* magazine (and the June issue of the *Computer Shopper*) gives the pin-out details on constructing your own User Port cable. *INFO* lists several commercial software packages that are compatible with the User Port interface, including EasyScript 64, SuperBase 64, PaperClip, VisaWrite, and Kwik-Write. PPD extends the interface for complete software compatibility with BASIC programming and the KERNAL ROM, for machine language programs.

All of PPD's features can also be user-configured with the included menu-driven customization program. User-specified printer initialization strings can also be installed.

In the June issue, there were two addresses mentioned from which to order the PPD disk. In the PPD article, itself, I mentioned several times to order from me c/o the *Computer Shopper*. In the main column, I mentioned another address. I would now like to clarify that the correct address for PPD orders is: Drude Micro Services, P.O. Box 533, Cedar Falls, IA 50613.

By sending your order directly to this address, it will speed up processing time by several days (and maybe weeks). So please send all your PPD orders to this address. Several readers have also written in expressing interest in getting User Port to Parallel printer cables. Those are also now available.

Prices for the PPD disk and cable are:

Registered PPD disk and assembled cable $35.00
Registered PPD disk and unassembled cable $25.00
Assembled cable only (works directly with EasyScript-64) $30.00
Unassembled cable kit only $20.00
Registered PPD Disk only $10.00

All prices are postpaid, U.S. funds only. Canadian orders, please add $5.00 to the above for shipping. Iowa residents, please include 4% state sales tax. Allow 2 weeks for personal checks to clear. Orders paid with Certified check or U.S. Postal money orders are shipped ASAP. Please make checks payable to "Ted Drude."

VIP Professional
continued from page 172

producers of VIP feel it has several advantages over Lotus 1-2-3.

Using what are by now almost conventional spreadsheet routines, VIP supports the use of "@" commands as a kind of shorthand way of entering the most commonly used formulas, as well as more complicated formulas traditionally used in business. For example, "@ sum(B1..B12)" would add the numbers in the specified range and present you with a total in the cell you used to enter the formula. A formula can be absolute, pertaining to only one range; or relative, performing the same operation on many ranges.

In addition, VIP supports the creation of "macros" and gives you quite a bit of documentation on the subject. Since macros have almost attained the status of a programming language and since there are many good books on the subject of their creation, we'll simply note, for those unfamiliar with the term, that a macro is similar to a batch file or to a programmed function key: using them, it is possible to set up a formula you may need to repeat; a series of sort commands; almost anything you can tell the program to do.

Saved as a macro and with a key or keys assigned to it, it can then be invoked at any time with just one or two keystrokes and thus becomes a great time-saver as well as a hedge against faulty memory: for once you have it correct and in memory, you don't have to remember syntax but only a single key.

Because a program such as VIP is powerful does not mean it is difficult to use. Lotus 1-2-3 attained its status on the best seller lists not only because it could do many things and do them well, but also because it was a program most literate people could pick up and use almost immediately—at least to some degree.

In emulating Lotus, VIP Professional also emulates the ease of use in the form of on-screen tutorials, the many menus and sub-menus that are called up on the command bar, and in the documentation which assumes you may know nothing about spreadsheets and so gives you a firm grounding in their theory and application, as well as taking you step-by-step through the creation of a home budget program.

At a suggested list price of $199.95, VIP is one of the more expensive programs for the Amiga, yet we feel it is well worth the price. Though several other good spreadsheets have recently appeared on the Amiga market, we've seen nothing else that puts the strength, simplicity and utility of VIP into one neat package.

If you've had need for a powerful program of this type, you need hesitate no longer. And if you've not used a spreadsheet before but have been sort of thinking about maybe getting your feet wet and learning what they're all about so that maybe you can do some of your number-crunching at home and maybe impress the boss while increasing your own productivity...If you've done any thinking at all along those lines, get VIP and start at the top. ●

INFO's C-128 AD: C-128 vs. 520 ST (vs. Mac vs. Amiga vs. PC/AT vs. Cray X/MP vs. ????)

I chuckled when I recently saw an ad for the C-128 in *INFO* magazine. Those loonies composed a mock C-128 ad which looked an awful lot like the infamous Atari 520 ST ad. The Atari ad, which circulated in a lot of magazines, compared the 520 ST (unfairly) to everything from a Macintosh and Amiga to an IBM-PC/AT. The comparison had the 520 ST coming out on top of them all. Funny thing was, although

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LISP
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all your legal moves, allowing you to never leave yourself vulnerable. That is very kind, but it is not the way the game is played. Moving the pieces with a mouse is a bother, considering that they must be moved in discrete steps that would lend themselves so well to keypresses.

Passing the dice requires a long click or the game will not recognize the command. The robot's dice are automatically rolled, he moves, passes the dice to you, and the dice are automatically rolled for you. It doesn't give you much time to examine the Robot's roll or his play.

All in all, HippoBackgammon is a fun game. It sells for $39.95 and is available from your dealer or Hippopotamus Software (985 University Ave, #12, Los Gatos, CA 95030, (408) 395-3190). The program is copy protected, but allows you to back up your customized robots on another diskette. At least this allows you to write-protect your only copy of HippoBackgammon. The ability to "program" your Robot teaches you about components of the game you may have never thought of before. It may also give you a feeling for the complexity of writing such a game and the decision-making processes involved.

Since there is big money only in new and innovative programming, perhaps beginning developers may want to look more closely at LISP and Artificial Intelligence programming. It may just be the better mousetrap they are searching for. ●

Personal Pascal For The Atari ST

by W. Krieger

Since it's creation in 1968 by Niklaus Wirth, Pascal has steadily risen in popularity to become one of the most widely used computer languages. There are many reasons for this popularity. Pascal was designed originally as a teaching language, and as such is much easier to master than either C or assembly. The strong structure of Pascal almost forces you to develop and use good programming techniques. Another big plus for the language is the availability of excellent low cost compilers for a wide variety of computers.

As an Atari ST owner I was very happy to see this carry over to the ST line. Optimized Systems Software, Inc. (1221 B Kentwood Ave., San Jose, CA 95129) has released Personal Pascal for the ST for only $74.95. OSS has been a long time supporter of the 8 bit systems by Atari, and have released several other languages for the 8 bit line. Including Action, Mac-65 and BASIC XL, all good products.

Personal Pascal is the first package I've seen from OSS for the ST and happily they have once again come out with a fine product. This is a very good Pascal package that includes everything you need to develop programs for your ST,: Editor, Compiler, Linker, and GEM support, all in one low cost easy to use system.

The first thing you notice when you open the Personal Pascal package is the manual, two hundred, over, pages of documentation. It is well written and divided into logical sections explaining the major parts of the Personal Pascal system. My only major complaint with the documentation is the lack of an index. I find myself constantly leafing through the book trying to find an answer to this or that question. I don't mean to imply that the text isn't well organized, it is, just that any technical publication of this size needs an index.

A big plus for the manual however is the honesty and cleverness of the writers, they tell it like they see it. For example in the introduction to

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Inside Commodore
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the C-128 ad was really meant to be tongue-in-cheek, its comparison between the C-128 and the 520 ST, is much fairer. And, feature for feature (just like Atari does it) the C-128 comes out on top!

It's provocative things like that which make *INFO* worth reading, even if it is a little expensive ($3.60 a bi-monthly issue). If you haven't seen this magazine, you're missing a lot of gut level reviews of software and hardware (not the sugar coated junk in some other Commodore-oriented magazines). Each issue, while often whirrling with the latest scuttlebutt, is also entertaining (to say the least) and full of...well...general Commodore info. (Which, I guess, is why it's named that.) Subscriptions are $18.00 a year, and single copies of back issues are $5.00. Get a recent copy and see if you like it: *INFO*, P.O. Box 2300, Iowa City, IA 42244.

Commonly Used Bulletin Board System (BBS) Abbreviations

Abrev.	Type of BBS it Describes
ABBS	Apple Bulletin Board System (Apple based)
AMIS	Atari Message Information System (Atari based)
CARN	CARNIVAL Bulletin Board (Atari based)
CBBS	Computerized (Christensen) Bulletin Board System (CP/M based)
CCBS	Commodore Computer BB (C-64 based)
CCMS	Computer Conference Message System (S100 based)
COCO	Color Computer BB (TRS-80 based)
CONF	Conference Tree System (Apple based)
DIVD	Diversi-Dial Multi-User System (Apple based)
DYM.	Dial-Your-Match (Apple or C-64 based)
ERAC	ERAC BBS (TRS-80 based)
FIDO	FidoNet International BBS Network (MS-DOS based)
FORE	FOREM Message System (Atari based)
FRON	Frontier BB (TRS80 Model 100 based)
GBBS	Apple-Based BBS (Apple)
IBBS	PC BBS (IBM-PC & Compatibles)
JNET	PCjr BBS (IBM-PCjr based)
MAC.	Macintosh BB (Macintosh based)
MCMS	Micro Computer Message System (TRS-80 based)
MUSR	Muser Multi-User System (Apple Based)
NBBS	North Star BB (NorthStar based)
NET.	Net-Works Communications System (Apple based)
NEWS	News and Message Service (TRS-80 Mod-16 based)
OABB	Other Apple BB (Apple based)
OTBB	Other TRS-80 BB (TRS-80 based)
PMS.	People's Message System (Apple based)
RBBS	Remote PC BB (IBM-PC & Compatibles)
RCPM	Remote CP/M BB
TBBS	The Bread Board System (TRS-80 & MS-DOS based)
TIBB	Texas Instruments BB (TI99/4a based)
UBBS	Universal BBS (Apple based)
UNIX	Unix BBS (PC based)

Table #1 - BBS Abbreviations ●

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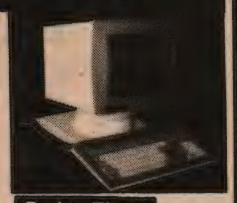

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Personal Pascal continued from page 180

the GEM library the manual states. "If you have been unlucky enough to see the Digital Research and Atari Corporation documentation, you will realize that even 2,000 pages are not enough to describe everything which can be done with GEM." For this refreshing approach to documentation I can almost forgive them for not having an index.

The Manual is divided into six sections, System Overview, Editor Reference, Compiler Reference, Linker Reference, GEM/Pascal Library, and the Language Reference. There are also appendices on the error messages and ASCII codes. Each section is organized to present the information in the same order you will be likely to need it.

Using the Personal Pascal system is simple. Everything is supplied on one single sided nonprotected disk. The system is accessed from a shell program (PASCAL.PRG) from which you use the mouse to set compiler and linker defaults or to invoke any of the three main functional parts: the editor, compiler or linker.

The editor supplied with the package isn't bad. I wouldn't want to use it as my primary editor but it has enough features to get the job done. In fact the best description of the editor comes from the Personal Pascal manual. "It (the editor) is not designed as a word processor or other general text editor, and it lacks many of the features one would expect to see in such a product. As a program editor, though it is at least adequate."

The best feature of the editor is that it is integrated into the Personal Pascal system. When the compiler finds a bug in your source code an alert box will appear on the screen asking if you want to ignore the error, edit the source or quit. If you choose to edit option, the editor is brought up, with your source file already loaded and the cursor on the line where the error occurred. This makes those missing semicolons a lot easier to live with. (For those of you who haven't used Pascal, every statement in Pascal must be separated by a semicolon. Leaving these out is one of the most common errors in Pascal.) Then when you are done fixing the error just hit F9 and your modified code is saved to disk and the compiler is invoked. This is the similar to the system used in Borland's Turbo Pascal and is in my not so humble opinion the way all compiler editor packages should be set up.

The compiler is however more than just adequate. While not the fastest in the world it does everything it's suppose to and does them well. The speed problem is due to disk IO, this is a common problem with running a compiler on a floppy based system. Luckily Personal Pascal isn't copy protected so you can easily run it from either a hard disk or a RAM disk. I run mine out of a RAM disk on my 1 meg. 520 ST and find this to be very quick.

Setting the different compiler options is done from the shell program. Just pull down the options menu and click on compiler. This opens a window with the compiler options using the mouse to select or deselect the ones you want.

The possible settings include compiling to a GEM or a TOS program. You can also turn on or off Pause after errors, full debug mode, range checking, stack checking, clear variables, and if you want it to automatically invoke the linker or not. You can also use compiler directives in your source code to set some of these and several other options. The most important of which is the ability to compile to a module for later linking.

Modular compilation will allow you to use Personal Pascal in concert with other programming languages, like C or assembly. The modules created are link68 compatible (the linker supplied with the developers system from Atari). The main use for this will more than likely be the linking in of assembly language routines to handle either time critical procedures or low level system calls.

The ability to compile to a TOS application allows Personal Pascal programs to be nearly indentical to Pascal on an IBM PC or other standard type system. I highly recommend this for novice programmers trying to learn Pascal. Any standard Pascal book can be used to get you started with Personal Pascal, then after you get the program running the way you want it is easy enough to come back and add the GEM features you want. While it's true that Pascal is relatively easy to learn, trying to master a new language and GEM at the same time is not something I would want to do.

The linker supplied with the system is fine. It seems to be fairly standard. It is easily accessed from the shell program. But in most cases it will be chained to the compiler so you can almost forget that it's there, unless you get to the point where you are linking together modules from two or more compilers. I see no reason

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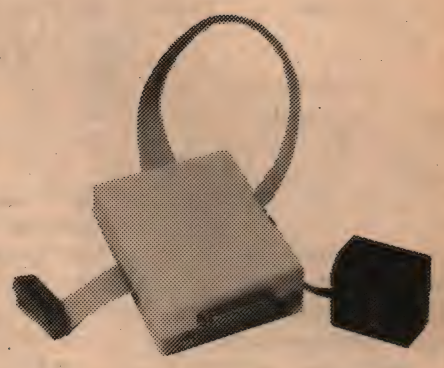

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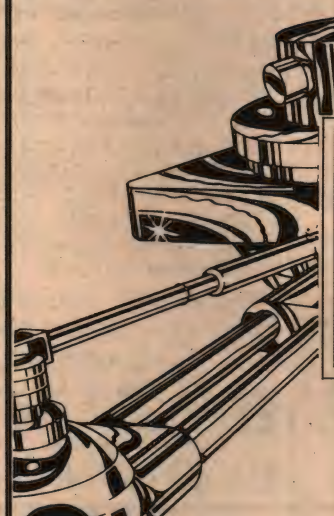

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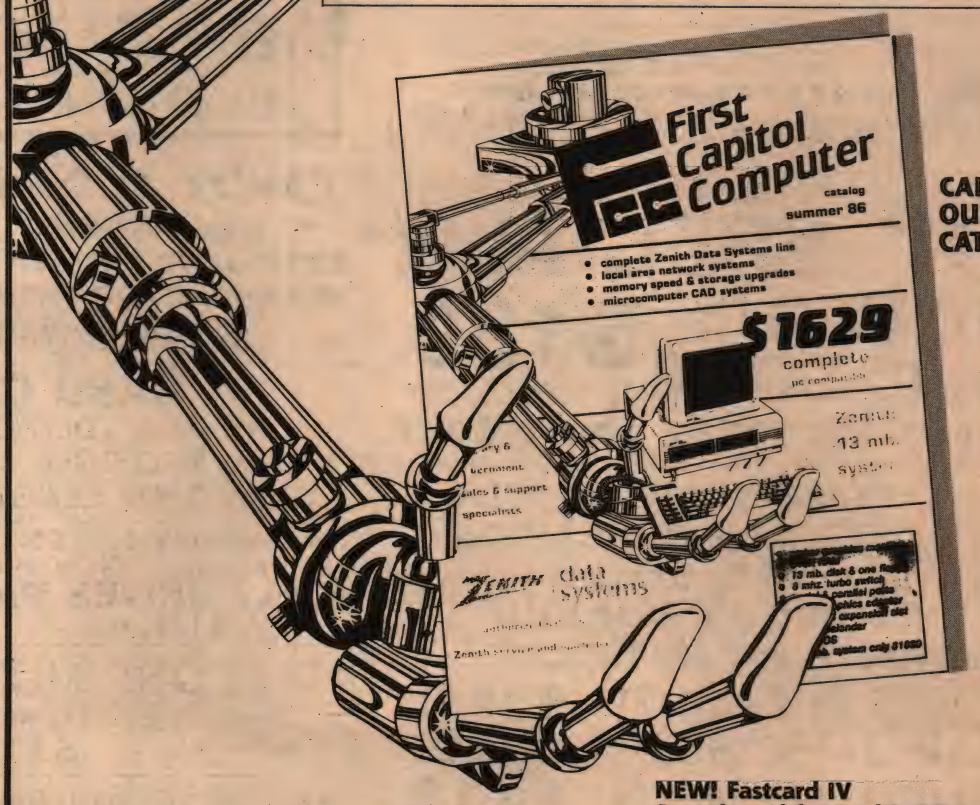

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Table III
continued from page 90

plays of selected questions and responses from each data base are included.

A Fast Overall Picture for Medical Professionals.
Anon
Computer Graphics World Vol.6, No.11, Nov. 1983, P. 98,100.

A menu-driven graphics program is being used by a California orthopedic surgeon to keep files, organize and present demographic data, and make presentation slides. PFS: GRAPH software is used with an Apple III computer and an Okidata printer. The software package was selected specifically for its ease of use.

A Model for Software Exchange: The College of American Pathologists Approach.
Walters, R.F.
Californa, Univ. of (Davis), Davis, CA
M.D. Computing Vol.1, No.5, 1984, P. 69-73,75. 5 Pages.

The College of American Pathologists was one of the first medical specialty groups in the United States to encourage its members to use computers. Starting with a manual pathology-test reliability comparison, the College soon realized that it needed a computer to help with the statistics. The College turned to a third-party computer services company for initial assistance. When College of Pathology work occupied more than half the computer services' time in 1971, the College bought the company. Continuing to use the computer for more and more work, the College decided to set up a computer users assistance program. One of the problems this assistance program addressed was the need to exchange computer programs. The College of American Pathologists has set up an exchange library that is so good it is a model for others to follow. The exchange library's collection of programs is listed.

A Model Of Regional Ventilation-Perfusion Inhomogeneity In The Avian Lung.

Hempleman, S.C.; Adamson, T.P.; Burger, R.E.
Computer Programs in *Biomedicine* Vol.17, No. 1/2, Aug./Oct. 1983, P.11-18, 8 Pages.

A model for simulation of gas exchange in the avian lung is presented. Intrapulmonary chemoreceptors (IPC) discharge frequencies during ventilation in perfused duck lung is recorded. The biological system of the avian respiratory lung, the modeling of the biological system and the results applied to IPC are detailed. The results indicate multiple receptive endings per IPC in the avian lung.

A New Computerized Tomographic-Aided Robotic Stereotaxis System.
Kwoh, Y.S.; Reed, I.S.; Shao, H.M.; Chen, J.Y.; Jonckheere, E.; Truong, T.K.
Memorial Medical Center, Long Beach, CA, 90801
Robotics Age Vol.7, No.6, June 1985, P. 17-22. 5 Pages.

The use of a robot arm in stereotactic neurosurgery is described. The robot selected was the PUMA 200 by Unimation. A custom-made probe holder was attached to the end effector of the arm. A host computer stored the images created by computerized tomography (CT) scanning of the subject and communicated with the robot and the surgeon via specially developed stereotactic procedure software. For intercranial surgery, an already available stereotactic head frame was adapted to function with the robot arm. Using the CT images, the surgeon indicated the X-Y coordinates of a target point, which were translated into the robot's three-dimensional coordinate system. The surgeon positioned the robot over an appropriate entrance point and aimed the probe holder. Software then adjusted the trajectory of the probe to match the entry point and the target. After the surgeon had drilled the hole, the robot was used to insert the probe. The robotic procedure was found to be more convenient and reliable than the stereotactic frame techniques currently in use. Drawings illustrate the equipment and techniques used. A photograph shows the equipment.

A New Method for Automatic Metaphase Finding Adaptable to Different Chromosome Preparations.
Schoevaert-Brossault, D.; Leonard, C.; Selva, J.
Hospital de Bicetre, Bicetre, France
Computer Programs in *Biomedicine* Vol.16, No.3, June 1983, P. 195-202. 6 Pages.

A computer program has been developed to use in conjunction with the the Cambridge Quantimet 720 image analyzer. This system can then do automatic metaphase finding in chromosome analysis. The system has advantages over other similar systems in that no time is wasted in fields not containing metaphases, the elimination of more extraneous images, and the use of an x10 objective lens to save time. A flow chart for the program is shown. A schematic diagram outlines the apparatus. Photographs show stages in the analysis of metaphases on the Quantimet display screen.

continued on page 186

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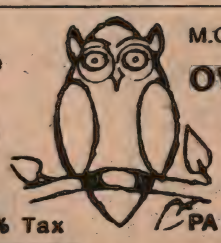

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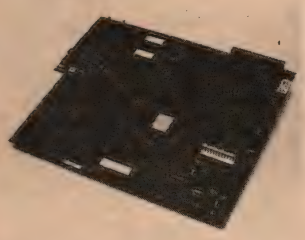

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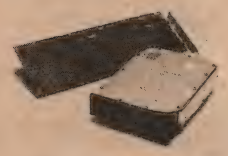

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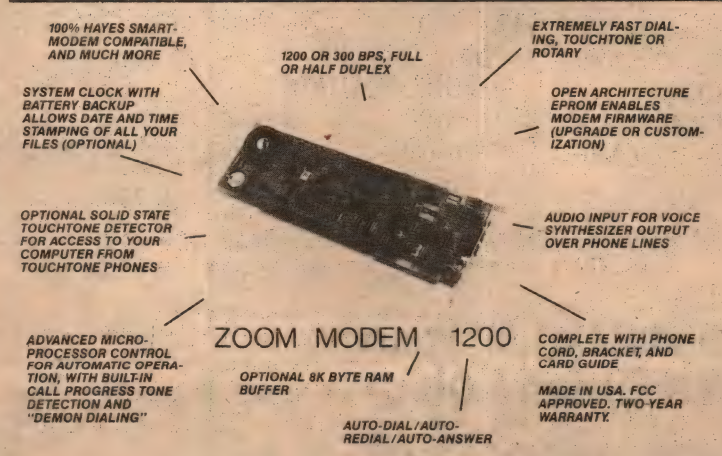

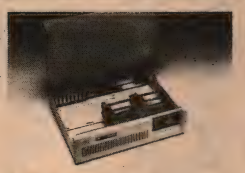

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to y. With our points, you proceed as follows: turn on 0,0; add 1 to x and .75 to y. Round off y (.75) to 1. Set point 1,1 to on. We continue by adding 1 to x and .75 to y. x is now 2 and y is 1.5. When we round off 1.5, we turn on the point 2,2. We bump x to 3 and add .75 to y; y is now 2.25 and rounding it off gives 2 so we turn on the point 3,2. Adding 1 to x and .75 to y gives us 4 and 3, so we round 3 off to 3 and turn on the point 4,3.

The disadvantage of this approach is that it requires the use of floating point math to compute M and for the adjustment to y. Floating point is time consuming, so if you can get away from it, your graphics would be quicker.

There is another approach to rasterization, known as Bresenham's Line algorithm. Bresenham's algorithm uses only integer math, which is much faster.

Instead of keeping track of the exact value of y for each step, Bresenham's algorithm tries to keep track of the relative size of y, without knowing the exact y value. The way it does this is to use two values for the adjustment of y, these are usually called incl and inc2 for increment 1 and increment 2.

incl is simply 2 * (y2 - y1) or 2 * delta y. inc2 is 2 * (delta y - delta x). This means that incl is always positive and inc2 is negative. We keep track of the relative value of y with a variable called d. When you bump the value of x, we look at the relative value of d, if it is negative, we add incl to it and we do not bump the y value. If d is positive, we add inc2 and we bump the y value. We start out with d equal to (2 * delta y) - delta x.

With our example, delta y is 3, delta x is four. This gives us an inital d of (6 - 4) or 2. incl is 6 and inc2 is -2. We turn the point 0,0 on, and then we add 1 to x. Since d is positive, we add 1 to y and add inc2 to d, d is now 0. We turn the point 1,1 on. Adding 1 to x, we get 2. Since d is 0 we add 1 to y and inc2 to d, making d -2. We set the point 2,2 on and we are ready for the next pass. We add 1 to x, and since d is negative, we add incl to d and do not bump the value of y. We can turn on point 3,2 to finish the pass. To finish the line, we add 1 to x, since d is positive, we add inc2 to d and bump y to 3. Setting the point 4,3 on finishes the line.

You will notice that Bresenham's algorithm sets the exact same points on as the Basic Incremental algorithm, but uses only integer arithmetic. Both of these algorithms draw an approximation to the line, and on longer lines you will notice that they generate a pattern. Except near the end points, there will be a certain number of points with the same y value. You might notice that a certain line will have 3 points with the same y value in a row, then another 3 points in a row.

The ST can draw a horizontal line very quick, so the line-a interface really draws a series of short horizontal lines to place the line on the screen. It has to figure out how many points in a row to draw for each line segment. Once it does this, it can repeatedly call the routine that draws horizontal lines, once for each segment of line.

The routines are written to run in medium resolution, but it would not be too hard to

continued on page 185

```
*
* 05/20/86  Some line-a routines
*

*
* here we have a list of the routines that are exported
*
.globl          _nocur
.globl          _setpt
.globl      _line

*
* here we have a list of defines useful for line-a work
*
intin           equ                     8
ptsin           equ                     12
x1          equ         38
y1          equ         40
x2          equ         42
y2          equ         44
fg_bp_1     equ         24
fg_bp_2     equ         26
ln_mask     equ         34
wrt_mode    equ         36
lstlin      equ         32


*
* here we have a list of functions for the line-a interface
*
init            equ                     $a000
setpix          equ                     $a001
getpix          equ                     $a002
line        equ         $a003

*
* here we have a routine to get rid of the cursor
*
_nocur:         move.w          #50,-(sp)                       * push n
ew flash rate
                move.w          #0,-(sp)
* turn cursor off
                move.w          #21,-(sp)
* xbios call to config cursor
                trap            #14
* perform xbios function
                addq.l          #6,sp
* clean up the stack
                rts
*
* a routine to turn a pixel on
* to call from C: setpt(x,y,color);
*
* We have a minor correction of the y value,
* it seems like DRI thinks 0 goes at the top
* of the screen, and the rest of the world
* wants to put 0 at the bottom of the screen
*
_setpt:     .dc.w           init
                move.l          intin(a0),a3                    * save t
he intin array address
                move.l          ptsin(a0),a4                    * save t
he ptsin array address
            move.w      4(sp),(a4)              * set x value
                move.w          8(sp),(a3)
* set color
            move.w          6(sp),d0                * fetch the y value
            move.w      #199,d1                 * y offset
            sub.w       d0,d1                   * correct y value
            move.w      d1,2(a4)                                * set y value
                .dc.w           setpix
* turn pixel on
                rts
*
* here is the routine that uses the line-a interface
* to draw a line.  we have to correct both y values
* (see setpt) and we have to translate the color
* value to a pair of foreground bits
*
* 'C' calling convention is line(x1,y1,x2,y2,color);
*
_line:      .dc.w           init                                * get po
inters
                move.w          #-1,ln_mask(a0)                 * set li
ne pattern (solid)
                move.w          #-1,lstlin(a0)                  * enable
 draw
                move.w          #0,wrt_mode(a0)                 * replac
e pixels
                move.w          4(sp),x1(a0)                    * set x1
                move.w          8(sp),x2(a0)                    * set x2
            move.w      6(sp),d0                * fetch the y1 value
            move.w      #199,d1                 * y offset
            sub.w       d0,d1                   * correct y1 value
            move.w      d1,y1(a0)                               * set y1
            move.w      10(sp),d0                       * fetch the y2 value
            move.w      #199,d1                 * y offset
            sub.w       d0,d1                   * correct y2 value
            move.w      d1,y2(a0)                               * set y2
            move.w      12(sp),d0                               * get co
lor
                move.w          d0,d1
* prep for mask
                andi.w          #1,d1
* mask for bit 0
                move.w          d1,fg_bp_1(a0)                  * set pl
ane 1
                ror             #1,d0
* shift bit 1 into place
                andi.w          #1,d0
* mask for bit
                move.w          d0,fg_bp_2(a0)                  * set pl
ane 2
                .dc.w           line
* draw a line
                rts
```

Listing 1.

Some assembly routines for the line-a interface.

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modify it to run in low or high resolution. You will notice that listing 1 is a series of assembly language routines that interfaces to the line-a routines.

After running some timing tests, it turns out that the Bresenham algorithm is more than twice as fast as the Basic Incremental algorithm, but the line-a drawing routine is more than 5 times as fast as the Bresenham! When I timed the line-a routine, it took only 2.32 milliseconds to draw a small outline house! As you can tell, the ST graphics are fast even though they are done by the 68000 instead of special graphics hardware.

The time has come for a discussion of the xbios and line-a functions used. The assembly routine __nocur uses the xbios 21 function to turn the cursor off. The cursconf function takes 2 parameters, the function and the flash rate. There are 6 functions that can be performed by the cursconf routine. They are:

0	Disable cursor
1	Enable cursor
2	Flashing cursor
3	Steady cursor
4	Set flash rate
5	Get flash rate

Disable the cursor really hides the cursor, it will no longer appear on the screen. Enable is used to make the cursor visible again once it has been hidden. Flash cursor is used to make the cursor a blinking cursor, while Steady cursor gives you a solid, non-blinking cursor. The Get flash rate function returns the old flash rate while the Set flash rate allows you to change the flash rate.

A word of caution about the flash rate, it is based on the vertical scan rate of your monitor. The color monitors use a different scan rate than the monochrome monitors, so the same flash value gives slightly different flash rates. This should cause no real problems because the 2 flash rates should be within 20 percent of each other.

The on time of the cursor and the off time can be found by: on time = off time = rate/vsrate, where rate is the second parameter in the cursconf call and vsrate is the vertical scanning rate of your monitor. In the United States, color monitors for the ST have a vertical scanning rate of 60 Hz, while the monochrome monitors have a vertical scanning rate of 70 Hz.

With a color monitor, if you perform a cursconf(4,30) call, then the cursor will appear on for ½ second and off for ½ second. The rate parameter is only used for the Set blink rate function of the cursconf call. Unlike many other ST calls, DO NOT USE -1 FOR THE RATE PARAMETER IF YOU ARE NOT CHANGING IT, USE 0 INSTEAD. If you use -1 as the rate in a cursconf call, it can cause the infamous "bombs" to appear on your screen.

Listing 2 contains a short program that shows the cursconf being put through its paces.

The next item to cover is the simplest line-a function, the init function. The line-a interface is named after a series of illegal op codes for the 68000. All of the line-a op codes start with a hex a. These op codes cause an illegal instruction exception when the 68000 encounters them.

The exception vectors the 68000 to a small graphics handler. The init function is used to get some addresses we need when working with these graphics functions. The line-a op codes have to be generated with define constant statements because they are not really instructions for the 68000.

The first function we can use to do some work is the put pixel function. To start off our set-point routine, we perform an initialization call with the $a000 op code. This gives us a pointer to a block of addresses, which we need for the points in array and the integers in array. We move the address of the intin array into register a3

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```
#include <osbind.h>
#include <stdio.h>

main()
/* simple demo of cursor configuration call */

{
printf("Setting cursor to solid.\n");
Cursconf(3,0);
delay(4000);
printf("Turning off cursor.\n");
Cursconf(0,0);
delay(4000);
printf("Turning cursor on.\n");
Cursconf(1,0);
delay(4000);
printf("Setting blink rate for quick flash.\n");
Cursconf(4,7);
delay(4000);
printf("Fast flash.\n");
Cursconf(2,0);
delay(4000);
printf("Setting blink rate for slow flash.\n");
Cursconf(4,90);
delay(4000);
printf("Returning blink rate to normal.\n");
Cursconf(4,30);
delay(4000);
}
```

Listing 2.

Use of the Cursconf functions.

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Table III
continued from page 182

A Primer on Word Processors—With Three Examples
McDonald, C.J.
M.D. Computing Vol.1, No.2, 1984, P. 26-35. 8 Pages.

A physician requires a word processor to improve staff efficiency, the quality of printed documents and letters, and his/her communications skills. PeachText 5000 by Peachtree Software Ltd., Image 3.0 by Micro Art, and Final Word by Mark of the Unicorn are three high-quality programs that make it easy to learn word processing on a personal computer. Two drawings illustrate the cursor control and the keyboard layout. Six screen displays illustrate some of the various commands and features of the three programs. Two displays show PeachText's special print commands for various print formats and its unique thesaurus commands. A display shows Final Word's special section commands for breaking a report into proper title subsections. A display shows Image's outstanding graphics capabilities.

A Sampling of Hardware and Software.
Roberts, K.
Medicine & Computer Vol.1, No.2, Jan. 1984, P. 50-55. 5 Pages.

There are 600 to 1000 medical practice management systems. Not all available systems were included in this buyer's guide. Each system listed had to have a good physician following or a good reputation or the confidence of the *Medicine & Computer* magazine staff.

A Suitable Case for Treatment.
Parkinson, J.
Sifo Group
Middle East Computing No.18, Dec.-Jan. 1984/1985, P. 21-23,25. 3 Pages.

Computers have made inroads into medicine in the Middle East. Computerization began in the 1970s, but was not suited for available technology conditions. Bilingual systems have been a major problem. Computers are generally used for administration, patient administration and diagnosis and treatment. They are also used for planning. Microcomputers and software packages have in-

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Personal Pascal
continued from page 181

why there would be any trouble doing this but I haven't tried it yet.

The GEM library is what you really buy the Personal Pascal package for. I love the way the manual puts this. "One of the most powerful features of the Atari 520 ST is the GEM desktop environment. From a programmer's standpoint, using GEM in a program can be almost impossible. Personal Pascal includes a GEM/Pascal library that provides an easy interface to GEM." I find myself in total agreement with this. I have tried in the past to work with the GEM stuff with the Developer package from Atari and almost gave up due to the frustration. While the GEM/Pascal library doesn't make window and event management as easy as falling off a log, it does make it manageable.

The GEM/Pascal library compresses most of the functions into roughly one hundred Pascal procedures and functions. Yes this is a lot of procedures and functions but there is a lot to GEM. All of the functions and procedures are well explained with a usage example for each. OSS points out that not all the features of GEM have been incorporated into the GEM/Pascal library. They do however include all that most people would ever use. And if you must access a GEM feature not supported in the library you can still access it via a direct call to GEM through the use of "C-type procedures and functions," which is a way Personal Pascal provides for the programmer to reference subprograms written and compiled with a C or assembly compatible with the Digital Research's link68.

All and all Personal Pascal is a good package. But what really makes me recommend it highly is the support that OSS provides their customers. I am convinced that the people at OSS really care about the end user of their products. For example, due to the nature of compilers it is impossible to create a running program that doesn't include some copyrighted code from the compilers libraries.

Many companies make you pay additional fees or royalties if you want to distribute or sell programs compiled with their product. Not OSS. All that they require is that you let them know that you might distribute programs. And that if you do that you include notice of OSS's copyrights in a form visible to the user of your program, displayed no less prominently than any similar notice of your own.

OSS also provides technical support to registered users of Personal Pascal. They have a support group that will answer questions during working hours (Pacific time), they have set up a BBS for 24 hour support, and they can be reached via Compuserve (user 72477,3703). So far I have only used their BBS system and found it well worth the cost of the call to California (I live in Florida).

There are some known bugs in this version 1.01 that are explained on the BBS covers, including information on fixes and work arounds. The routine Bring_to_front (used in window management) was misnamed Bring_to_front, though the manual refers to it by the correct name. Also numbers sometimes appear in the ITEM SELECTOR dialog where they don't belong. And the Delete_Dialog call sometimes causes crashes. OSS has a patch program available for downloading to fix these plus a few more fairly obscure bugs.

There is a problem with the PASLIB file causing undefined symbols if you try to use the Cmd_Arg or Filename functions. If you need to use either of these you must tell Personal Pascal to make two passes through the PASLIB file by putting the name PASLIB into the "Additional Link Files" box in the "Linker Option" dialog.

The routines IO_Check and IO_result will not work unless they are declared to be EXTERNAL. If you need to use them you will need to use the following declarations:

```
Procedure IO_Check (on : Boolean);
  EXTERNAL;
Function IO_Result : Integer ;
  EXTERNAL;
```

The files on the BBS are not all bug reports or fixes. OSS also has many example programs and informational documents for downloading. The document on file IO using GEMDOS calls is a must get. Also the programs showing GEM/pascal library stuff being used are extremely helpful.

The only trouble I have run into that wasn't covered on the BBS has to do with using Personal Pascal on a two drive system. I am used to using Turbo Pascal on my other system where I run the compiler in my A: drive and have all the source and include files in the B: drive. Personal Pascal however is set up assuming that all library and include files will be resident on the disk with the compiler. It will read source code from and write output to the B: drive just fine but if you have any include files or libraries B: drive Personal Pascal will not access them unless you supply the full path name in your include directive I.E. {$I b:Myconst.inc}.

Taken all together the problems with the package are minor, and can easily be worked around until OSS can fix them. The strong points of Personal Pascal far outweigh the weak ones. I can sum up my feeling on it in two words: BUY IT. You will be happy you did. ●

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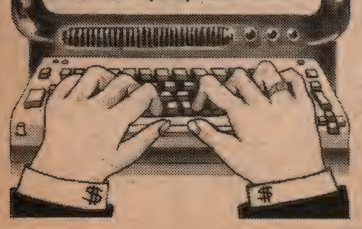

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Hacking The ST
continued from page 185

```
_peekb:     move.l    4(sp),a0          * get address from stack
            move.b    (a0).d0           * get the byte
```

and the address of the ptsin array into register a4.

Once we have the addresses we need, we move the x value and color value into the arrays. The y value is inverted to put 0,0 at the lower left of the screen. When everything has been moved into place, we perform the put pixel call to turn on a pixel on the screen.

The line routine is very similar to the put pixel routine, but we now have two x values and 2 y values. We also have to convert the color value into bit plane values. The routine given handles all the details.

Listing 3 is a simple peek function written in assembly language. This function was left over from the previous column.

If you would like to save yourself the trouble of typing in the programs that appear here, send $6 to: Shopper ST Disk, 3456 Willis Drive, Titusville, FL 32796.

Be sure and ask for Disk 1, it contains the programs from the June, July and August Hacking The ST Columns.

Next month, we will have more assembly code, and letters from our readers. Keep 'em flying. ●

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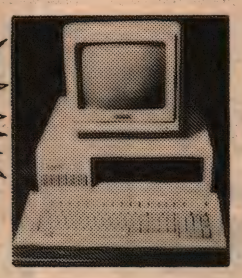

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Review — *Serious Programming in BASIC*

by Fred Blechman

BASIC is probably the most-used microcomputer language. It may not be the most elegant or powerful language, but it is available for virtually every micro, and comes "bundled" with most. Many micros have BASIC built into ROM (read-only memory), so it automatically is available when you turn on the computer.

Since BASIC is so popular, there have been numerous beginner's books addressing the subject. However, the many versions of BASIC (Microsoft, Apple, Commodore, Sinclair, Texas Instrument, etc.) make most books confusing or downright unusable if your particular computer BASIC is not specifically covered. This has led to many machine-specific BASIC books that apply only to a particular micro system.

Serious Programming in BASIC was written for people who want to develop serious application programs in BASIC. It was written FOR programmers BY a programmer. It goes well beyond beginning BASIC, and covers the language as used in Apple, Commodore and IBM PC computers. If you are wondering how to get more productivity and performance from your BASIC programs, want professional advice on program development strategies, or are searching for a reliable source of time and effort-saving codes and subroutines, this book may provide the answers.

Focusing on the most-used versions of Microsoft BASIC and BASICA for the IBM PC/XT/AT and its compatibles, as well as Applesoft for Apple II series computers, and BASIC 2.0 for the Commodore 64/128, this comprehensive sourcebook includes a wealth of subroutines and short programs written in all three dialects. Not only do these programs illustrate the principles of sound program development, they also form the basis of a personal subroutine library that can be used again and again in programming practice.

Taking a simple, straightforward approach, the author gives you the full advantage of his extensive experience in professional software development. The techniques, procedures, and subroutines follow four themes. The first theme is that programs should be "friendly" to users—input protection, information display and ease of operation. The second theme is that programs should also be friendly to programmers—logical, organized, readable, well-documented, and maintainable.

The third theme is programmer control—utilizing the computer's capabilities for information display, operator input, program control, and file handling. The fourth theme is systematic program development—using a predetermined strategy and modular top-down construction.

The book contains examples of BASIC code in three dialects —IBM, Apple and C-64. Many of the code examples consist of subroutines and short programs. Where the code is similar among these three versions of BASIC, a single code example is given. Where it differs greatly, separate examples are shown.

To keep the text from becoming too unwieldy, some of the Apple and C-64 code examples are explained in separate appendices. Most of the text is illustrated with IBM PC BASIC, which is generally regarded as the most standard of the many current versions of Microsoft BASIC.

The book is organized into nine chapters and two appendices. Chapter 1 discusses techniques for making your program friendly to users and to other programmers. It describes some programmer's tools, and sketches a strategy for program development. Chapter 2 offers advice and suggestions on the materials you should acquire before attempting a serious programming project—hardware, software and publications. Chapter 3 offers programming tips.

continued on page 189

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Those wishing to contribute additional volumes are encouraged to contact the Forth Interest Group. The FORTH Interest Group is a worldwide non-profit organization with over 5,000 members. Its 80 chapters are devoted to the Forth computer language. FIG membership of $30.00/yr ($37.00 foreign) includes a subscription to *FORTH Dimensions*, a bi-monthly publication. FIG also offers product discounts, group health insurance, an on-line data base, a job registry, a large selection of Forth literature, and many other services.

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Computers And Dyslexia

by Hal Nieburg

I have observed a series of miracles during the past two years! Minor miracles as the world goes, but major ones for the person involved. The miracle occurred between a microcomputer and a learning-disabled person, in this case a young adult. He was bright and intelligent, yet suffered from an all too common affliction, Dyslexia, the inability to read and write.

The 1966 Random House *Dictionary of the English Language* defines "Dyslexia: An impairment of the ability to read due to a brain defect." Dysgraphia is a sub-class of dyslexia. It is an inability to write, a function inseparable from reading, but involving distinguishable skills. In colloquial usage, the former term encompasses both handicaps.

Dyslexia involves some combination of the following: reading skills far behind their peers with no apparent explanation; frequent reversal of letters (such as b for d, and was for saw), entire words, and numbers; reversals in speech (aminals for animals); illegible handwriting; confusion between left and right, up and down, yesterday and tomorrow after the age of 6; bizarre spelling errors.

Research demonstrates that about 2.1% of all children show some symptoms of the two maladies, and that males tend to outnumber females about four to one.

Since 1966, we have become even less sure of the causes. It is now felt that brain defects may not be the culprit in many cases. A recent work published by the Institute for Child Development rejects the uncurable label, finding it more fruitful to concentrate on treatable aspects.

"Dyslexia," says the Orton Society, "is a kind of mind, very often a gifted mind — there have been many famous, productive, creative dyslexics..."

Is it due to a poor start in learning how to read? Coercive and intimidating teaching, kind of a visual equivalent of stuttering? Bad habits which become a vicious circle? Defective eye structure? Other emotional problems? Genetic disposition? We still don't really know, but we are learning increasingly that methods can be invented to work around the cause and to lead many victims to almost normal reading and writing.

In some ways, dyslexia resembles autism, the twisted inward emotional development by which some children withdraw from the real world into themselves. One variety of autism is "echolalia" where the child repeats what others say to him, or perhaps phrases from TV programs, as though the words were meaningless except

continued on page 190

Serious Programming
continued from page 188

Chapters 4 through 8 cover various programming subjects—output and screen design; data entry, error-testing and validation; program control; program modularization and chaining; file handling. Each of these chapters discusses how to get control of a different aspect of your computer, and offers advice on how to do this in such a way that your program will be friendly to users.

Chapter 9 is devoted to the subject of documentation—a topic seldom covered in ordinary programming guides.

Henry Simpson, the author, has excellent credentials. He is a writer and consultant, and has written several other books. He is former West Coast editor of *Digital Design* magazine and has written articles on microcomputer topics for numerous publications.

I've personally written five books on BASIC programming for beginners on various computers, and found this book full of things I either didn't know about at all, or knew too little about. If you are beyond the beginner stage in BASIC, this book should provide an effective bridge into serious programming, just as the title promises.

Serious Programming In BASIC
by Henry Simpson
TAB Books
Blue Ridge Summit, PA 17214
TAB Book #2650
230 pp., 155 illus. 7" x 10" format
$14.95 Paperback
ISBN 0-8306-2650-6
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Computers And Dyslexia continued from page 189

in some dim primordial closed world of the child's mind. Instead of normal development, we find self-stimulation, repetitive rhythmic rocking to and fro, the delay of all learning, including the uses of language, spoken and written.

Rather than being generalized to all behavior, the interference of internal with external signals in the dyslexic only becomes apparent within the context of early reading and writing lessons. The withdrawal into self focuses on language skills while allowing other aspects of the personality to develop more or less normally.

As one expert said, "It's as though they're processing information in a different way. It's a form of tunnel vision." The child's ability to deal with the world is narrowed into a tiny slot. When they encounter reading and writing, it's like a tiny field of vision at the end of a long tunnel, and "it's difficult for them to take in much information that way!"

Their defenses against the outside world get in the way of learning. Their minds are saturated with internally-generated signals and little gets through the noise. That is why the learning patterns of both dyslexics and autistics are utterly unlike those of retarded or brain-damaged individuals. The latter show a slow but steady increase in learning, while the former appear to make little or no progress for a long period of time, then suddenly show leaps of achievement which come as a surprise to their teachers.

The disease exacts a heavy toll on sufferers because most of them are normal in other respects. In fact, many of them are found to be of above average intelligence. Their struggle with the tools of learning becomes that much more poignant! Their evasions and escapes from the symptoms become that much more wasteful and heart-breaking.

The typical dyslexic has difficulty associating sounds with written symbols. The eye and brain distort the characters, reverse the letters, transpose syllables. Sometimes they are unable to bring the signs into focus, making a page of print swim before them with meaningless spots and swirls. The young mind soon recoils in distrust of all written and printed language, begins to see the school as a place of mortification, and the teacher as an enemy.

Until recent years, dyslexia treatment and therapy have been notably unsuccessful. Part of the problem is the system of education itself which tends to drive the disease underground, where it may go undetected for years, wreaking the self-image and life chances of the victim.

Some success has been reported by the five Landmark Schools devoted to dyslexia. A new one for college age and gifted students was opened last year in Putney, Vermont. They are dedicated, not to "bypassing" literacy which is the easy way out for most mainstream schools, but to making communication skills the core of the curriculum. Only in this way can these students be helped to cope independently with the world they must live in the rest of their lives. A B.A. degree without literacy, they believe, is a cruel hoax.

Computer-Assisted Learning

Now there is major help for the victims of the disease. The help comes from the microcomputer, and from all kinds of software, including the full range from games to spelling checkers. By my observation, this is a clear case where the Luddites are wrong; technology can provide new solutions to age-old problems.

Just as the computer has accelerated literacy-training of normal children, so it is having remarkable results with learning disabled at every age level. The experience of many is proving the microcomputer a marvelous tool in the process of writing and, in the learning how to write, people can also learn to read.

Writing, it appears, is the means by which deep-rooted reading problems can be yanked to the surface and solved! Many who suffer this malady turn against learning and reading and find ways to endure without them. They take refuge in mental incompetence and insanity or, if they are lucky, find a more-or-less normal life without literacy.

Victims can be normal in every other respect. Many compensate by accentuating vocal speech. Highly verbal, they specialize in oral culture, and mastering the rudiments of existence by acute observation. This is what makes the disease so hard to detect in small children. With an incidence of two out of every 100 children, it is easy for the teacher, especially in early grades, not to notice. The children learn to hide their disability, proving themselves by verbosity and, when reading begins, memorizing the sounds and faking the exercises.

In the later grades, when it may already be too late, the process of concealment breaks down. And teachers generally draw the wrong conclusion,

continued on page 198

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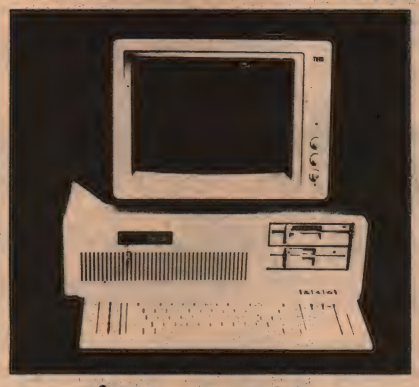

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Table III
continued from page 186

creased the rate at which health care is being computerized. The Armed Forces Hospital in Saudi Arabia has computers for administration, clinical services, off-site clinics and communications. While there is no attempt to standardize, linking systems provides a certain amount of standardization. In the future, computer systems will not be added, but will be a part of the basic hospital construction. These systems will be used by individuals. There will be continued connection between hospital and clinic systems. A major hospital system is Giza System's CHIS Hospital Information System.

A Surgical Cut into Computers.
Davis, Roger S.; Jack, David B.
M.D. Computing Vol.3, No.1, Jan./Feb. 1986, P. 21-28. 8 Pages.

The use of computers by surgeons and medical researchers is increasing with the advent of high-resolution screens, large memories, sophisticated software and specialized processors that extend the uses of interactive computer graphics. The first scientific applications for computer graphics was molecular modeling to illustrate the structure of DNA molecules, and they are now used to show the drug-binding process and to define the small details of protein folding. Three-dimensional structures are beginning to be used for anatomical modeling, craniofacial applications and kinesiology to measure abnormal gait and stride. Surgeons use the systems to simulate surgery, using a zoom feature for selective enlargements and manipulating the graphics to fine-tune planned reconstructions. The potential promised by artificial intelligence and expert systems promises to extend the applications of computer graphics in medicine in the future.

A System for the Analysis of Long-Term Electrocardiographic Studies in Clinical Research and Training.
Lastra, A.A.; Pritchett, E.L.C.; Reiter, J.J.; Smith, M.S.; Smith, W.M.
Duke University Medical Center, Durham, NC, 27710
Computers and Biomedical Research Vol.16, No.4, Aug. 1983, P. 340-346. 7 Pages.

A computer system has been devised for teaching and research oriented long-term analysis of electrocardiograms. It is easy to use and learn because it has menus, interactive graphics, and modular software. The system has been based on a PDP 11/23 microcomputer with a 256K main memory, a vector-oriented graphics terminal, and a two-channel analog-to-digital convertor. The software is in the C Programming Language run under the UNIX operating system. A block diagram of the system operation is shown. Diagrams show QRS waveforms for operator interaction. Sample menus are shown for operator interaction.

A System for the Positioning Correlation Between Computed Tomographs and Conventional Radiographs.
Mauo. I.; Kaneko, M.; Ohshima, M.
Kamamatsu University School of Medicine; Asahi Medical Corp., Tokyo 100, Japan
Computerized Radiology Vol.7, No.1, Jan.-Feb. 1983, P. 61-66. 6 Pages.

A system of image processing has been developed in Toyko to help radiologists correlate computer tomographs (CT) and film radiograph images. The two images are projected on a video monitor. The CT image is removed except for outlines and the new superimposed image is called a replaced computed radiograph (RCR). The RCR image is then digitized and processed by the CT software. There is some loss of resolution from the film X-Ray, but the results are still useful. Twenty-two clinical experiences with this system demonstrated its usefulness. A block diagram shows the integration system. Photographs of sample images are provided.

Advanced Medical Expert System.
Anon
Software World Vol.16, No.3, 1985, P. 23.

Logica will be playing a major role in an ESPRIT project that will involve the investigation of nervous and muscular diseases using electromyography. Real time input signals from electrical probes will be analyzed using expert system techniques. The research and protyping phase will be followed by the development of an operational system.

Advanced System to Automate Clinical Labs.
Anon
Computer Systems in Southern Africa Vol.13, No.7, July 1983, P. 58.

continued on page 193

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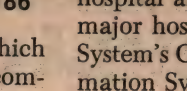

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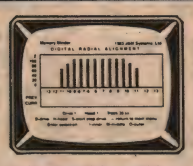

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Table III
continued from page 192

The McDonnell Douglas Corporation is introducing a laboratory information management system called Labcom. It can function independently or be interfaced with other hospital computer systems. The system allows for rapid review of laboratory results by various hospital departments and also sends appropriate departments charge and billing information. The database is very flexible. Labcom includes both software and hardware.

Ambulatory Care—1985.
Stefanchik, M.F.
Computers in Healthcare Vol.6, No.7, July 1985, P. 44-45.

There has been a large increase in ambulatory care facilities in the U.S. since 1983. Computers in Healthcare (CIH) conducted a survey in 1985 to identify computer needs. Twenty-two percent of the responding clinics have recently updated or are changing their systems. There is a mixture of hardware being used, but seventy-five percent of the clinics use at least one personal computer. The American Group Practice Association (AGPA) study of 1984 revealed less microcomputer usage; charts of the AGPA hardware use results and computerized applications are included. In the 1985 CIH study, patient billing, patient scheduling and patient registration were the major computer applications. Fifty percent of the CIH survey respondents considered improved service delivery as the primary benefit of their computer systems. Some problems that were reported in the 1985 survey were lack of interdepartmental communication and software incompatibility.

An Ethical Question.
Bez, H.
McAuto Health Services, South Africa
Computer Systems in Southern Africa Vol.13, No.7, July 1983, P. 47-48.

It would be unethical for private medical laboratories to increase their profits by purchasing inadequate computer systems. System down conditions can be very dangerous and life threatening for some patients. Manual retrieval of printed records is sufficient only for small laboratories and for brief infrequent system faults. To ensure computer system reliability of a sufficient level a pathologist must have two processors to gain access to data bases, the data base must be divided into sub-databases, and there should be duplicate printers, duplicate input devices, correct environment, uninterrupted power supply, and reliable hardware and software from a reliable supplier. Aside from being ethical it is economical because maintenance need not be immediate because of back-ups.

An Information System Coordinates Patient Care.
Bodendorf, F.
Freiburg Cancer Center, Freiburg, West Germany
Data Report Vol.12, No.4, Dec. 1984, P. 31-35. 5 Pages.

Cancer centers scattered throughout West Germany share a communications system based around a common data base containing nationwide information about diagnoses, treatments and result, as well as ongoing clinical research and statistical analyses of the population. The system also enables the cancer centers to remain in close contact with hospitals and personal physicians, and can provide such services as the production of patient profiles and reminders about patient follow-up. The system is versatile and flexible, having been designed to serve various specialist departments and novice users. In addition to providing easy access to the data base, it already enables users to implement their own special programs as well as make use of centrally stored software and communicate via electronic mail. A map indicates the location of the cancer centers. Diagrams illustrate features of the system.

continued on page 194

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Table III
continued from page 193

An Outcome-Coded Birth File from Machine Readable Vital Records.
Holland, S.; David, R.J.
Northwestern University, Evanston, IL
Computers in Biology and Medicine Vol.15, No.1, 1985, P. 25-39. 12 Pages.

A computer program was designed that matches birth files with birth-infant death files to develop a comprehensive outcome-coded birth file. The program is inexpensive to run, permits the use of standard software packages without data re-entry, creates random samples, cross-checks record filing practices and provides epidemiologic researchers access for multivariate analyses. The outcome-coded birth file program, written in FORTRAN is listed in the appendix. Flow charts illustrate program algorithms, a table presents mortality calculations, and sample output is given.

Applications of a Signal Averager for Neurophysiological Investigations in Clinical Function Laboratories Using a General Signal-Processing Unit.
Van Den Akker, T.J.; Ros, H.H.; Koeleman, A.S.M; Saat, R.G.M.
Computer Programs in *Biomedicine* Vol.17, No.3, Dec. 1983, P. 249-260. 10 Pages.

This averaging system for electrophysiological signals uses a coherent signal averager software package designed for use on small laboratory computers. Parameters are set up by means of predefined investigation protocols. Applications include routine clinical work as measurement of neuro-ophthalmological phenomeno as visual-evoked potentials and non-invasive atrial activity separation.

Applications of an Inexpensive Microcomputer for the General Radiologist.
Richardson, M.L.
USAF Hospital, Mather AFB, CA, 95655
Computerized Radiology Vol.7, No.1, Jan.-Feb. 1983, P. 49-60. 12 Pages.

Computer power is now conveniently and inexpensively available for the radiologist or small group of radiologists. The low-cost personal computers can use the growing body of public domain software for medical and business applications. This software was formerly only available on larger machines. Some of the applications of use to radiologists are statistical pattern recognition in counting blood cells, Bayesian analysis for calculating likelihood of a disease in a particular patient, and artificial intelligence applications. Computer assisted instruction and business applications are also valuable to the busy radiologist. A table gives an example of Bayesian probabilities for disease. Special applications are available to the handicapped radiologist.

Appointment Scheduling by Computer
Roach, V.K.
Technology Management, Indianapolis, IN
M.D. Computing Vol.1, No.6, 1984, P. 17-26. 9 Pages.

Sophisticated scheduling systems are available for multigroup and hospital-based medical doctor practices. Such systems provide capabilities in four broad categories: administrative support and management reports, the performance of intravisit procedures, appointment slot selection and the classification of physician's availability and scheduling policies. The strengths and weaknesses of eight, minicomputer-based systems are reviewed. The vendors of these systems are: COMTEC, Inc., Control Data Corp., Cycare Systems, Inc., Global Health Foundation, Kaiser Foundation, Medical Systems, Inc., Phamis, Regenstrief Institute, and EPIC Systems Corp. Two tables compare the characteristics and the functionality of these systems. Five screen displays show some of the systems' outstanding features. A table lists the policy issues involved in a system. A directory of the vendors is included.

Arbitrary-Waveform Generators Provide Versatility and Utility.
Schutz, R.
Wavetek Corp.
EDN Vol.29, No.7, April 5, 1984, P. 199-204,206+. 8 Pages.

Arbitrary-waveform generators are now commercially available for producing complex, precisely definable waveforms that cannot be generated by simple conventional signal generators. Two types of arbitrary-waveform generators are available, one pioneered by Hewlett-Packard, and the other by Wavetek Corp. The HP product utilizes software and a microprocessor to convert an ordinary function generator into a vector generator that will produce arbitrary waveforms. It is currently limited to generation of a thirty-three Hz signal consisting of 150 vectors. The Wavetek Model 275 arbitrary-function generator produces signals from user-specified signal characteristics of number of points and relative amplitudes. Generators of arbitrary waveforms are used to simulate complex biophysical waveforms and generate realistic but complicated test signals for communications circuits and industrial control. Several illustrations describe the generators and their applications.

Are You Guilty?
Dudley, A.
Medicine & Computer Vol.1, No.5, July/Aug. 1984, P. 25-27. 3 Pages.

Physicians should be aware that the use or non-use of computers in medical practice may be increasingly linked to legal questions. Software and hardware manufacturers' could be liable if computer error led to harm in medical practice. Some experts expect such medical-legal issues to be tested in the courts in the coming decade.

Automating the Medical Records Department at HUP.
Baur, M.B.; Viale, R.O.
Computers in Healthcare Vol.4, No.12, Dec. 1983, P. 44-45.

Three key principles adhered to during the Hospital University of Pennsylvania's (HUP) implementation of a computerized Medical Records system were that the hospital was in the health care business and not in the computer business, that no single vendor has the expertise to supply all of the hospital's computing needs and the system integration would be accomplished through a computer network. Important features of the Medical Records Management System (MRMS) were a master patient index, discharge abstracting, medical chart tracking, medical chart completion surveillance and departmental statistical reporting. HUPs MRMS software modules, purchased from Code 3 Corporation, became operational in 1983 and has met expectations.

Beyond Essentials
Freedman, B.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.14, July 24, 1984, P. 291,293.

Appropriate hardware and sophisticated accounting and billing software are the essential components of a medical office management package. There are many extras of variable value available. Some programs allow for the addition of tax or interest to patients' accounts. Software security systems can be used. Electronic appointment calendars are sometimes useful. Integration of software is helpful

Bringing the Lab to You.
Dudley, A.
Medicine & Computer Vol.1, No.7, Nov.-Dec. 1984, P. 31-33.

The Department of Pathology and Laboratory Medicine at the University of Nebraska Medical Center is a reference laboratory for about forty clients and has developed a communications network of Apple II microcomputer systems to transmit lab results to the clients rapidly, accurately and economically. The software for the network was developed at the University and allows clients to receive reports from the lab, review all reports received after a given date, and review specific lab reports by patient. The lab provides the hardware at no cost to clients doing a minimum level of business each month because it streamlines the interaction between the lab and the physicians it serves, because it reduces postage costs and because it allows the lab to control its costs better.

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- 5500-7700 (Can Reload All)	1/2 x 13	$15/2	$42/6	$ 78/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
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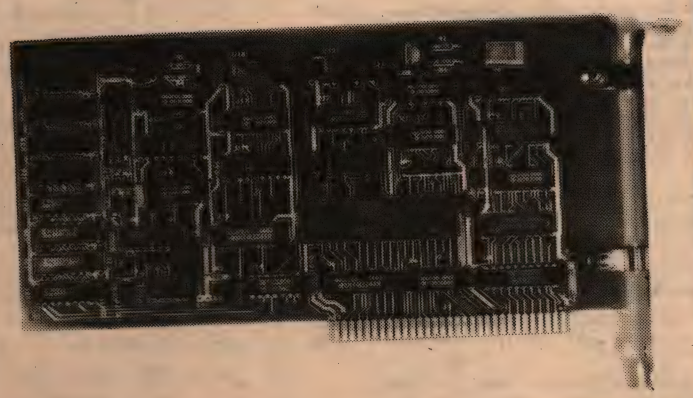

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Table III
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Bulletin on ASTRA Systems: Beckman.
Anon
Computers in Healthcare Vol.5, No.8, Aug. 1984, P. 92.

A bulletin published by Beckman Instruments, Inc. outlines all the Astra automated clinical chemistry systems. Each system - Astra Ideal, Astra 8, and Astra 4 - is described and product features are noted.

Buyer's Guide '85: Medical Practice-Management Packages.
Cushing, C.E.
Medicine & Computer Vol.2, No.1, Jan./Feb. 1985, P. 60-63,66+. 6 Pages.

A selected sample of medical practice management software packages are presented. For each software package included the guide provides the name and address of the company, the name of the product; general specifications and the number installed when available, and price information. There are no ratings or comments on quality or usabiltiy included. There are fifty-four practice management software packages included.

Calculator Programs to Deal with Non-Steady State, Multiple Dosage
Regimen Clinical Pharmacokinetics.
Ensom, R.J.; Nakagawa, R.S.
University of British Columbia, Vancouver, BC, V6T 1W5, Canada
International Journal of Bio-Medical Computing Vol.14, No.4, July 1983, P. 287-309. 23 Pages.

A series of user-written software programs has been created to aid in optimizing dosages for certain drugs. A Hewlett-Packard hand-held calculator can thus predict concentrations for up to seven different serial regimens. The limitations of the program system are documented. Tables give abbreviations used, and user relationships between the programs and the input and output. Sample outputs are shown for Theophylline and Gentamicin.

Choosing a Medical Accounting Package.
Day, B.
Computers in Medicine Special Interest Group
Computer Systems in Southern Africa Vol.13, No.7, July 1983, P. 44-45.

Selection of an appropriate computerized accounting system is very difficult yet important for medical doctors. The Computers in Medicine Special Interest Group has made extensive surveys in order to determine which packages are the best. The medical accounting package industry is very dynamic and a new questionnaire is included in the article. Significant system features are clear definitions of the system, references, and costs.

Circulation (Organs).
Anon
Access: Microcomputers in Libraries Vol.3, No.1, Spring 1983, P. 21.

Circulation (Organs) is a program for grades 5-12 that teaches the human circulatory system. It requires Applesoft and DOS 3.2. Its cost is $29.95.

Clinical Research System.
Katz, Barry
M.D. Computing Vol.3, No.1, Jan./Feb. 1986, P. 53-55,61. 4 Pages.

The Clinical Research System (CRS) from International Medical Products Corp. is a database management system customized for the storage and management of patient data, especially that collected from clinical trials. It is designed to be used by health care professionals without extensive computer backgrounds, and requires 128Kbytes of RAM, a color/graphics adapter card, two diskette drives or one diskette and a hard disk, and PCDOS 2.0 or later. It runs on IBM PCs and compatibles, and comes in three versions: CRS I for $900, CRS II with storage of more data for $1,800, and the CRS III, the multisite version for $3,000. CRS is easy to use and powerful enough for the requirements of most clinical research facilities, with the ability to record the time and date of observations, and it will be a better alternative to the standard database management packages that require a considerable amount of customization for clinical applications, but it is recommended that users wait for the next release of the package after the bugs are worked out and the reference guide is improved.

CMA's System Has Its Ups and Downs.
Friedman, B.
Medicine & Computers Vol.1, No.5, July/Aug. 1984, P. 20-21.

Medical Office Management by Charles Mann and Associates is a database system for use in private medical practice. It is designed to maintain patient information, process bills, schedule appointments and generate reports. Its list price ranges from $795 to $1,575. The system is low priced, can produce a large range of reports and can be modified. Negatively, the system allows for only one insurance code and one fee schedule and does

continued on page 197

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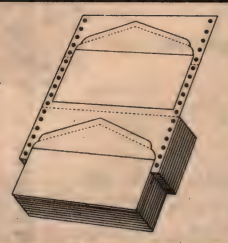

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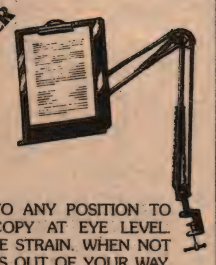

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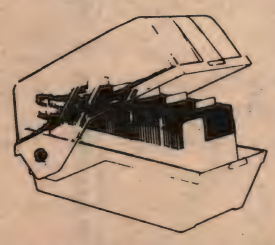

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Table III
continued from page 196

not check for errors in entered names and dates.

CMS Adds McAuto to Pharmakon System.
Anon
Computers in Healthcare Vol.4, No.4, April 1983, P. 14.

Continental Medical Systems (CMS) announced that McAuto has contracted to be added to the list of CMS's Pharmakon software purchasers. Pharmakon will be converted for use with McAuto's Hospital Data Collection System.

Communications: Cymalink Support Service.
Anon
Hardcopy Vol.13, No.8, Aug. 1984, P. 117.

Desert Wind Communications and Cyma will provide Cymalink service and support for subscribers. The Cyma line consists of business and medical applications. The subscription covers telephone support, seminars, and training.

Computer Aided ECG Interpretation.
Ginzton, L.E.; Laks, M.M.
Harbor UCLA Medical Center
M.D. Computing Vol.1, No.3, 1984, P. 36-44. 7 Pages.

A history of computer-aided ECG interpretation since 1950 is outlined. Computerized ECG packages are available from five major vendors which enable accurate diagnoses, either locally or remotely. Computerized ECGs are usually rechecked for accuracy by a cardiologist. Larger systems can compare previous ECGs of a patient with his old ones for changes. Flow diagrams for analysis are illustrated, as are typical examples. Several companies have developed their own ECG programming languages instead of FORTRAN. Companies offering ECG services are listed.

Computer Graphics and an Interactive Stereotactic System for CT-Aided Neurosurgery.
Rhodes, M.L.; Glenn, W.Y.; azzawi, M.Y.; Howland, R.S.; Hibbard, D.L.
Multi-Planar Diagnostic Imaging, Inc.
IEEE Computer Graphics and Applications Vol.3, No.5, Aug. 1983, P. 31-37. 7 Pages.

Neurosurgical operations can be accomplished more quickly and with greater accuracy using a stereotactic system. Such a system consists of an image generation device (usually a computed tomography-CT-scanner), a mechanical frame, and a procedure to translate points in the image-system image to frame positions. After pictures of the patient's head are taken with the CT scanner, target and entrance locations are selected. These locations are fed to the computer which then gives instructions for frame adjustment and probe placement. This method allows for the assessment of different probe trajectories prior to surgery. New developements in the frame and software have made this process faster and easier. However, as the procedure must be executed in the CT scanner suite, not an operating room, many surgeons are concerned about lack of sterility and distance from life-support equipment. Drawings of the frame, CT images, and diagrams of the geometry of scan-to-frame registration are included.

Computer Operating Systems a Hedge Against Computer Obsolescence?
Speck, P.K.
Medical Computer Journal Vol.3, No.6, 1984, P. 161-164. 4 Pages.

Computer obsolescence has to be accepted by the purchasing physician. Operating systems presently provide the only hope against computer obsolescence. Medical software programs presently exist. A table that compares popular small systems operating systems against important capabilities is included.

Computer-Aided Information Management Systems in Clinical Trials.
Pollak, M.N.

continued on page 198

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Computer Smyth's primary interest is hands-on construction, modification and expansion of micros. We see the IBM PC phenomenon as a giant magnet or vacuum, dragging hardware and software talent into a vortex of activity that ignores and overshadows the line of new CPUs and peripheral hardware enhancements that are becoming available. We believe 32-bit architecture is the proper and exciting growth direction for micros and too little talent is being invested in that opportunity.

Computer Smyth's editors are also determined to cover all opportunities including the rich offerings of the IBM lines as they appear and especially to evaluate the so-called clones.

We believe magazines are hard-copy networks—or extensions of the central nervous systems of those who read them and interact with each other through them. The inter-stimulus factor accelerates each participant's learning curve, produces new combinations of ideas and new answers, and defines fresh problems. We are content and idea centered—not just a sales medium for consumer goods.

Who reads *Computer Smyth?* We're looking for the intelligent, technically curious and adventurous computer buff who isn't afraid to take the back off the case, who likes new experiences and digs into any device, unsatisfied until all its mystery is dispelled and its potential is fully in hand. Our reader is a craftsman who enjoys building, even while finding the adventure just a little scary.

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Coming up in 1986: a switched power supply; an EPROM programmer; a safe, active circuit tracing tool; a silicon disk; how to identify and find microchips; how to buy a superplus keyboard; and builder reports on four single-board computers: Z80, 64B180, PC and XT.

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Trends continued from page 18

propositions from a set of axioms. Prolog is a much simpler language to learn than Lisp but many researchers feel that it is not as effective a tool.

Prolog has been made available for the MSDOS computers in the form of Turbo Prolog by Borland International and as Prolog I from Chalcedony Software. Prolog/m is also available for Macintosh from Chacedony Software.

The following is a list of some books that will be of interest to our readers.

They are available from Infosource, P.O. Box 21092, Midtown Station, New York, NY 10129.

Introduction To Artificial Intelligence; Charniak and McDermott; Pub:A W; IS #46064; $34.95

CD-ROM—The New Papyrus; Lambert and Ropiequet; Pub: MS; IS #46052; $21.95

ADA A Programmer's Guide; Stanley, Krantz et al; Pub:AW; IS #46000; $21.95

C Answer Book; Tondo and Gimpel; Pub:PH; IS #46068; $17.95

Advanced C: Techniques and Applications; Sobelman and Krekelberg; Pub:Que; IS #46069; $19.95

Common Lisp: The Language; Steele; Pub:DP; IS #46054; $30.00

Modula 2—A Seafarer's Guide and Shipyard Manual;Joyce; Pub:AW; IS #46048; $16.95

Programming in Modula 2; Wirth; Pub:SV; IS #46045; $18.95

Using Turbo Pascal; Wood; Pub:MGH; IS #46071; $19.95

Programming in Prolog; Clocksin; Pub:SV; IS #46075; $17.95

Turbo Pascal For the IBM PC; Radford and Haight; Pub:WDS; IS #46070; $24.50

Medical Resources continued from page 197

Department of Medicine, University of Toronto, Toronto, Ontario, Canada
Computer Programs in *Biomedicine* Vol.16, No.3, June 1983, P. 243-252. 9 Pages.

Traditionally, clinical studies only used computers at the end of the process to analyze the results. The increasing expense of clinical trials can now be reduced by utilizing computers during the earlier stages of the study. Data management programs can reduce costs and allow more sophisticated studies to be accurately conducted. Commerical statistical software packages such as SPSS and SAS do too little. The ONCOCIN expert system for cancer treatment is too sophisticated for clinicians at this time. The Protocal Management System (PMS) is presented as having just the right amount of features for present day clinical trials.

Computerizing a Small Practice
Friedman, B.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.11, June 12, 1984, P. 355,356,357.

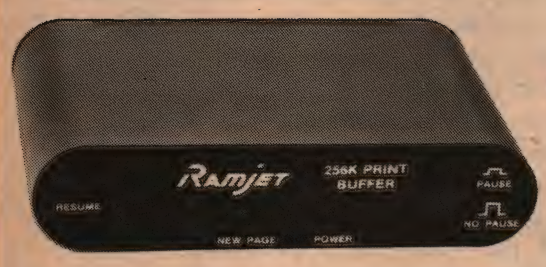
Medical professionals are relying more and more on computers. A number of programs are available for use in the office or hospital to help take care of routine problems. Most software now available to the practitioner involves billing and accounting. In choosing a system, a comprehensive package should be selected. Most software is being developed for the IBM PC. A hard disk system is preferable to one with floppy disks.

Consultants Perspective on Medical Office Computerization.
Freedmen, E.; Hecht, E.M.; Whiteside, G.
Medical Planning & Management
Computers in Healthcare Vol.6, No.1, Jan. 1985, P. 62,64,66+.

Medical office computerization has developed into an industry over the past fifteen years, as computer hardware decreased in price and size, and software increased in sophistication. The 1980s have seen the agressive development of patient scheduling/appointment systems and the availability of practical paperless claims processing. Computerization is changing medical office management by allowing managers to devote more time to evaluating reports, planning, marketing, and addressing other important issues. More and more offices are willing to consider in-house computer systems over the service bureau approach. Clinical applications are the most exciting developments at the current time.

Computer-Assisted Urological Test Facilities Diagnosis.
Anon
Computer Vol.18, No.4, April 1985, P. 104.

continued on page 224



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Computers And Dyslexia continued from page 190

accusing the child of not trying. The typical dyslexic child is actually trying much harder than his classmates, but then is accused of an "attitude problem," or is pushed aside as "not very bright."

Repetition allows the child to memorize very quickly, so that he/she masters a text quickly. But the learning fails to transfer when a new text, at the same level of difficulty, is placed before them. The teacher sees a deliberate and maddening perversity in the child's behavior. Even the dedicated teacher may despair when repeated efforts fail to produce progress.

This pattern may drive the problem deeper. Memorizing the sounds and faking their early exercises, the dyslexic child may soon cultivate avoidance and denial of the problem, taking comfort in the official designation of "learning disabled," and deliberately playing the "dummy" role expected by adults and teachers.

One does not usually find a dyslexic young adult in college. They rarely make it this far. But it does happen, especially in the case of a child who succeeds in concealing the affliction throughout public school education. Reading is easier to fake or avoid than writing. But there are so many poor writers in secondary schools, one more is hardly noticed; the poor writers continue to be pushed

continued on page 200

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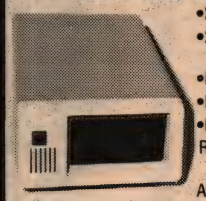

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ahead. Many there are with high school diplomas, with all the normal faculties, who never learned to read and write.

Among these are a certain number of dyslexics, bright and undismayed enough to venture into college. It is harder to succeed in this environment without knowing how to read and write; but it is not impossible. The difficulties can be overcome. Listening carefully at lectures can often be better than taking notes; speaking up in class can impress the professor. Help can be secured to write a paper out of class. Only exams written in the classroom will show a fall from grace.

The professor will be nonplused why such an obviously intelligent person could turn in an illiterate paper. But, poor exam performance can average out among all the course work of the semester, and the student can win a passing grade — without grappling with his/her invisible dyslexia.

Since the 1973 Rehabilitation Act, dyslexic students have been encouraged to come out of the closet. Once the disease is diagnosed, the school is obliged not to deny them equal educational opportunities. Ways are found to evaluate progress without the customary reliance on reading and writing. Like the resources available to the blind, readers may be assigned to read to them; recorded materials, lectures and textbooks, can be accessed with a small cassette tape player; instructors may be asked to administer oral exams; and so on.

This is a costly and often inconvenient route for the schools, but, after several years of foot-dragging, the law has been broadly interpreted, and is being implemented to some extent in the public schools, somewhat less at the college level.

As an adaptive technique, the microcomputer is now coming into its own — not only as a way around the problem, but as a treatment that shows promise of actual remediation. The microcomputer works, in conjunction with typewriters, cassette tape recorders, and oral communications, as an alternative to writing in support of subject matter learning, both to demonstrate skills and knowledge and to aid the mastery of content (as for example in note-taking). But, even more important, it appears to work also to bring about surprising improvements in writing and reading skills.

Poor motor coordination or inability to express oneself in writing can lead to enormous frustration and withdrawal. But computer-assisted instruction is interactive, so the chronic dyslexic enjoys instant feedback, reinforcement, and control, responsive entirely to his/her own rhythms. This modulated and lively support is different in kind from all ordinary means of treatment.

An Accomplice, Not A Teacher

The computer becomes not so much a teacher as a confederate, an accomplice, and extension of the very faculties of the student. Recent breakthroughs by severely dyslexic students in college convinces me that the micro offers something new and more promising than anything that pre-existed it.

The introduction of the micros into school systems was received with mixed reactions. Many studies showed no differences between paper-and-pencil drill and computer drill, although the initial blush always seemed to heighten motivation. Children saw the machine as a new game and were anxious to play with it. Thus, more time was voluntarily spent at school work than would normally be the case.

It seems that every decade there's something new in educational technology. Everyone goes overboard in adopting the innovation as though it were a panacea for all ills. Early enthusiasm led to an explosion of machines in the schools, and a vast increase in software, teacher training and investment of instructional resources. That wave has now crested, and predictably, the expectations have not been realized, and an air of disappointment prevails.

However, it was also clear that the honeymoon quickly wore out. Just as home computer games have crashed on the market, so the novelty of computer-learning declines, and the children spend less time on the keyboards. We are on the threshold of the third stage of the process — to reestablish balance, to maintain and improve the very real if more modest contributions of computer-assisted learning.

Computers do have important advantages for some purposes. Although artfully contrived, interactive computerized teaching routines, however efficacious, are inherently inferior to the presence of a live teacher; however, a computer can emulate a live teacher better than any other instrument that we know of, except possibly a live-in lover, and it exceeds the teacher in availability, patience, and physical endurance.

Learning-disabled students are often ashamed of the special needs that distinguish

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Computers And Dyslexia
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them from their peers. They devise all kinds of behavior to evade comparison, hiding disability, denying mistakes, or taking refuge in permanent inferiority. Because the computer is private, patient, and forgiving, much of this stress is eliminated. Children cannot fake out the machine with snow-job answers, either. Continuous and positive monitoring and feedback tend to bolster self-esteem, a sense of importance, and accomplishment. Learning-disabled often have greater need for drill and practice, which is always available without irrelevant pressures.

One-on-one tutorials are showing promise at the Landmark schools, where the problems of the dyslexic are out in the open and not a source of hidden shame. The computer permits realtime emulation of the same situation accessible to those who cannot go to a Landmark school or cannot afford a personal tutor at their beck and call many hours of every day.

In problems of dsylexia/dysgraphia, where so many good intentions have already failed, the break-throughs may be incremental and slow, but they are real and unique!

Many learning-disabled people are gifted in other respects. These may be particularly helped in improving skills of listening, speaking, reading, writing, motor-coordination, and math. Logical and sequential thinking, of which such students are fully capable, can be practiced and demonstrated with the use of personal computers. Programmed learning can be individualized, tailored to the specific strengths and weaknesses of each student. Programs can include diagnostic and prescriptive features which keep the learner informed of progress and goals, an important aspect in maintaining motivation and permitting a constant audit of performance.

Biofeedback systems have enjoyed considerable success in breaking through the shuttered world of autistic children, so that the child can control the pace and selection of external stimuli with a minimum of effort or anxiety. In the same manner, computer programs for dyslexics can maintain just the right amount of learning pressure, externalizing the learner's perceptions and leading him by his own hand.

As micros gain faster operating systems and unlimited RAM, AI (artificial intelligence) plays a more significant role in developing new software. Simulation and game-playing capabilities invite more situation-learning programs, so that a sense of real-time excitement and direction can be maintained. Students learn information by manipulating objects and facts and thus discover new ideas by themselves. In addition to learning about things, they learn how to learn, and how to apply the basic tools of learning, reading and writing. A start can be made in repairing any dyslexic/disgraphic deficits incurred over the years.

A more practical aspect for adult dyslexics is the use of word processing and editing programs.

Word processing on a microcomputer is a wholly different medium from typing. Writing on a computer is organic, fluid and reflexive, like the processes of thought. Ideas are not developed in a linear row, end on end, one after another. They spring into the mind half-formed, like clouds in the wind, bursting forth unpredictably, now here, now there, swirling together; mixing and separating like brush fire, like smoke, taking this and that form, pausing for a moment with awesome architecture, then dissolving once again into chaos and movement.

We begin to understand a computer can model this process, not only for the dyslexic, but also for people with normal faculties. Computers allow us to write the way we think. Hard copy imposes its own implicit ethic. Words already

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Computers And Dyslexia
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written on paper take on an authority and a permanence of their own. The writer's imagination and will are increasingly locked-in, as though the written words were engraved in granite.

Not so on the computer. Here mistakes are easy to correct without retyping large chunks of material. Clean copies of revised text can be printed out instantly, changing the granite-like nature of printed prose, which intimidates even professional writers. The computer turns text into a infinitely maleable substance, a species of modeling clay or finger painting. Writing becomes as soft and comfortable as basket-weaving, and transcends mere occupational therapy, because it serves the real needs of everyday life. It opens a critical dimension of self-expression which had been closed to the dyslexic from birth; thus, like no other technology, the experience of recording thoughts on the computer beckons the imagination of the learning-impaired.

Spelling and style programs add another dimension. They remove the petrification of will that blocks the creative process when faced with uncertainties of grammar or of spelling, not to mention the piling-up of masses of errors on the page. Text creation software can allow gifted dyslexics to build and use richer vocabularies, to play with richer ideas on the screen the same way they play with computer games, to experiment with words until they find the right ways to express their thinking. And, since writing is also an act of self-discovery, this process also leads to the discovery of one's own thoughts. And in the process, dyslexia begins to fade away.

Elliot's Story

As a college professor, the author first encountered the problems of dyslexia/dysgraphia in a student, let's call him Elliot, who was enrolled in his intermediate level course on Public Opinion. The course required that students write, administer, and interpret the results of polling questionnaires.

Elliot was obviously bright and loquacious. But strangely enough, when assignments were due, he turned nothing in. The situation was permitted to drag on for many weeks, before the professor asked for a conference. He was prepared to come down hard on this inexplicably lacksidaisical, if charming, young man.

When Elliot appeared at his office, the professor read him the riot act. "No excuses. It is time to get down to work! I expect to see all these assignments on my desk in the next week."

Apparently, it was Elliot's method in all his courses to wait for the ceiling to fall in before raising the issue of his disability. Professors are difficult to move. They like to do things the way they are accustomed. Until the issue is propounded to them, they cannot conceive of anyone getting through their courses without reading and writing. Especially in a course on Public Opinion. How can anyone expect to win a passing grade without conducting a number of polls, which require considerble reading and writing?

The professor was taken aback when the student told him that he could not read or write. His first thought was, "You shouldn't be in this class! Probably not even in college!" He felt a strong impulse to see the young man's statement as a ploy to avoid work, or to turn in work late. Every professor has seen so many ploys, excuses, and alibis! But never this one.

"How can I violate a lifetime of principles? Written work is the heart and soul of a college education. Does anyone deserve to call himself a college graduate who cannot read and write?"

Then Elliot pulled out his Ace card. The Rehabilitation Act of 1973, Titles 402 and 403! He put the case on the table. "In another course, I have appealed my situation right up to the president of the university. He consulted lawyers. The university has to provide me with a chance to earn credits without written work! It's the law!"

The professor sat with his mouth open. He felt he had been mugged. His professional standards were about to be violated. He certainly was not ready to give up a lifetime of teaching methods because this callow youth had pulled a law on him! He would find a way to resist.

Elliot was apparently very familiar with this situation. It was the story of his life. He had been through it many times before. Someday, perhaps, enough professors would be cognizant of the situation so that he would not have to refight the same battle every semester.

It was a painful adjustment for me, the professor, to find new methods to evaluate a student's work. Is Elliot faking? Had he been getting away with it all these years? I was ignorant enough about dyslexia to believe that there must be a cure! Perhaps I could effect a cure where others had failed?

So, I began to think about ways Elliot might make progress against his handicap. As I became accustomed to the idea of Elliot's problem, I began to see the world from his point-of-view, to appreciate the mass of scar tissue the young man had built up to hide his frustration with himself and escape the constant humiliation he felt before professors and classmates.

As the truth began to dawn, I thought there was indeed a way out of the dilemma, a way that had not been tried. The solution to all problems, I already deeply believed, was two-fold, jogging and the microcomputer. I had been using an IBM-PC for two years, a Kaypro II for two years before that. Elliot was already a jogger, I discovered, but he had never been introduced to a real word-processing on a computer. The next time I summoned him to my office, I broached the topic. I would give him the necessary training to get him started. Would he be willing to try?

He did not spring to the bait. He could not read the manuals. (I said I would read them to him or tell him what to do.)

How could he read the words on the screen? (We will try it. You can take as long as you want. We can keep a pad and pencil handy, and try to write some of the words down by hand. I would provide simple exercises which would flash a word or phrase on the screen and wait for him to type the same word or phrase on the keyboard. With practice, the skill might improve.)

He said he could not spell most words. (It's OK. We will worry about that later. A spelling-checker might be usable here to do it for him; but let's begin by learning to get some words onto the screen, however spelled...)

I started him with WORD-

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RETEM (an interrupt return code to come back from the 8080 code mode: EDFDH) and CALLN (another interrupt code to call 8086/8088 code block from within the 8080 mode: EDEDH + Interrupt Number)

Using the above instructions you can call any MSDOS Interrupts and execute CP/M programs freely. If you put CP/M programs in MSDOS format on your disk, download using a telephone wire or just a pair of wires and a suitable modem, all you are required to do to run a CP/M program is 1) read in the CP/M program into memory under MSDOS, 2) set up a CP/M Call to MSDOS Call translator, or alternately load a CP/M system with a custom tailored BIOS in high memory, 3) jump to the CP/M program with the BRKEM code to execute it and 4) return to MSDOS when finished with RETEM instruction. The CALLN instruction will be very useful when writing a simple CP/M-MSDOS DOS-CALL Translator.

If the CP/M program can be written independent of CP/M DOS Calls with its own input and output routines or all the DOS functions are done through calls to the MSDOS BIOS, you are not required to go through the DOS-CALL Translator. Following a simple experiment in the List 1, you can try out the feel of these 8080 emulating instructions. Supposing you have a V20 in your machine already, you can start testing the 8080 emulation by calling DEBUG and typing as shown in the List 1.

Reviving of Silver Box

As you read in last month's column, my Silver Box has been ill for over a month now. There were two different problems. The first disaster involved the VB550, the old Color Board in which four ICs were damaged by my mistake. The second disaster involved two ICs of ten ICs connected to pin A9 of the expansion connector pins, the D0 line. The cause of the damage was not simple, and partly due to the new color monitor I put on top of my Silver Box, which deformed the bottom metal under the heavy weight of the new color monitor.

I want to relate to our readers about two accidents caused by my stupid mistakes and what steps I am taking to correct them. I suppose our readers are more than casually interested to know what happened and what can be done to prevent them and what approaches I took to repair the damages.

The accidents took so much of my time allocated for writing this column and with your permission I have to postpone some projects and some interesting topics until next month. This includes details of the Farrow-Mod on the VB512 among other important topics. The following reports are written as the event took place.

The First Disaster

I had reported some interesting minor problems I encountered with the three boards submitted for evaluation. The inside of my Silver Box was bulging with the "Speed Board," the "Missing Link" and the VB550. Wait a moment, did I say VB550, the color board? That one is no longer inside the box now, a casualty. While I was swapping and testing the boards, pulling one off and pushing the other into the expansion socket, probably about the 20th or 30th time, I stacked the VB550 on top of the "Missing Link" hoping it to work flawlessly this time, but, when I switched the power on, I heard a disconcerting noise, a small explosive sound, a kind of popping sound.

A puff of blue smoke issued under the VB550, the color board, then I smelled a distinct odor of burning epoxy plastic, the material which covers most components used in a computer; the ICs, the board itself and the capacitors. The smell indicated a bad mishap had taken place somewhere under the board on the component side. I immediately switched the power off but naturally it was too late.

I examined the boards carefully after pulling out the bundle of boards. Then, I kicked myself unmercifully and severely. The color board was mated with the "Missing Link" with only single row of pins! The other row of pins was out of connector. That means, the pins A1 through A31 were mating with socket row B. A true disaster, since the row B carries the power to the board. All ICs connected to pins A3, A29 (the +5V line); A1, A31 (the +5V return, the ground line); pin A9 (the +12V line), would be most certainly affected.

Sure enough, the VB550 was no longer functional. I smelled each ICs. I detected one which carried the characteristic strong odor. The IC, U15, 74LS245, had several pins smeared with smoke residue, a tar like material any pipe smoker is familiar with. Upon close scrutiny, I found two more suspects with tar-smeared pins. These were U14 and U28.

I fired up the board with separate +5V source and started to explore the pins, just like I described in the last column. I found too many pins with odd voltages such as 2.2 volts, 2.4 volts and so forth. I cut all the pins off the most obviously damaged one, the U15, and resumed the test. I still got odd voltages around the remaining two suspects which were both 74LS244. This type has the "three-state" outputs, that the outputs will be floating, not connected to anywhere inside the IC unless the Enable Pin is at the low state. So, unless the Enable Pins are at the low state, you do not know exactly what you are poking at.

I picked up an old experimental board with thousands of wires wrapped around thousands of pins. I pulled out one #28 insulated wrap wire and soldered it to pin 1, the one of the two enable pins of 74LS244. I poked the tip of the wire to touch the ground. This should connect the output pins to the internal outputs, and since this IC houses eight non-inverting buffers, the output pin status should reflect the potential at the inputs. The input of pin 6 (the strong suspect because it was connected to the A29 pin of the expansion connector) was open and high at normal 1.5 volts for an open input. The output for this pin was low at 0.2 volts, a clear indication of a bad IC.

The other 74LS244 had the two inputs close to zero volts, yet, the corresponding outputs showed high outputs when enabled, a clear indication of another bad one. I removed both by cutting pins first and then removed each pin with a pair of small pliers and a pencil iron.

The one thing you must be careful of in this type of situation is that all the outputs of two or more three-state buffers, or flipflops, could be connected in parallel. If you energize any two ICs at one time, the ICs may collide and heat up, one sourcing large current and the other draining the current coming from the former.

This condition can be partially detected by the fact that the ICs involved will heat up only when both are enabled at the same time. The buffers are capable of producing high (up to 70 milli-amperes for each output) output current and they can become quite hot in this condition. You should check the *TTL Databook* to know them and how to expect them to behave. If you do not have the book already, you can buy a Texas Instruments *TTL Databook* from their distributor and look through it. It may give you a very good idea of what these ICs are.

After putting new, pretested replacement ICs, I checked the +5V line for a short with my multi-meter on R X 1 Range. It showed low resistance, about 15 ohms on my meter but it was not shorted. This is normal and the board was ready to be tested in the computer and it worked.

The Second Disaster

There is no question about the rough handling given to the Main Board in my Silver Box. I put in and pulled out the Video Boards and Expansion Boards ten to twenty times a day for a ten day period. When I replaced these boards, I had to disconnect the Disk Interface Cable every time I want to swap the boards. The strain is tremendous, flexing the Main Board around the stress areas. I had anticipated some problems. It was a matter of time for something to take place, a broken pin, a dead short or an open trace.

At the beginning, it showed up as an intermittent. The computer cover had been off for some time and the main board remained unsecured. This morning when I touched the Back Panel attached to the Main Board which served as a convenient handle(!), the computer blinked. The results of the intermittent were either halted operation or restart without reset. The latter also effectively halts computer since the keyboard Interface, 8215A, is re-initialized without resetting it. This means no keyboard action.

Then, a few tries later, the computer stopped booting. The BIOS ROM contains a primitive initializing routine to set the VRAM page; keyboard Interface, 8251A, to receive only; clear RAM at Segment 0800H; clear the color VRAMs HD46505S CRT Controller initializing sequence (Hitachi at Segment F000H; check the status of JP2 which controls the

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VISION (Bruce & James, Mass Market Software, Ltd., $49), which he soon learned to manipulate with ease. The colors and iconic file-folders delighted him, along with the automatic paragraph-forming and right-justification. Soon he was getting lots of words onto the screen, even if they did not make a lot of sense and he had difficulty reading them back to me. He tried some simple short stories about himself and his adventures, which came off rather well. With my help, he would clean up and edit the early draft and print off a clean copy. He did a lot of letters to his family and friends.

For spellers, we started with WORDPROOF (by IBM, $39) which was able to read and correct WORDVISION's files. He loved to watch the program snap the real words into their assigned places in his text, replacing the stunted and limping survivors of his efforts, leaving behind a smooth and mature piece of prose.

Elliot could hardly believe that he wrote it. As he worked, the ability to see the screen and to read the words gradually improved — beyond my wildest dreams! This did not happen rapidly. The effort continued for weeks and months. I had to give him an Incomplete in the course when the time came; but we were already confident that eventually he would earn a passing mark the hard way, by doing the same work as his classmates in much the same way! And in fact, that day came earlier than I expected.

So absorbed had he become in the PC, that he kept looking for new ways to use it. In addition to composition, he began to use spreadsheets and databases for his polling data, and statistical software for manipulating and analyzing his results. By talking to other teachers and students, whom he came to know well from spending countless hours in the micro lab, he learned about other software.

Later, without my help, he stumbled upon FRAMEWORK

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ATARI TELEPHONE MASTER

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ASJ 10 REM ATARI TELEPHONE MASTER
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
XEJ 30 FM=FRE(0)-1500:MAX=INT(FM/32)
SPJ 40 DIM NAME$(FM):NAME$=CHR$(0):NAME$(FM)=CHR$(0):NAME$(2)=NAME$
HKJ 50 DIM CE$(2),INV$(59):CE$=CHR$(30):CE$(2)=CHR$(31)
QPJ 60 RESTORE 70:FOR I=1 TO 59:READ N:INV$(I,I)=CHR$(N):NEXT I
OGJ 70 DATA 104,104,104,170,165,88,133,208,165,89,133,209,104,104,168,240,16
ROJ 80 DATA 24,165,208,105,40,133,208,165,209,105,0,133,209,136,208,240,24,138
OBJ 90 DATA 101,208,133,208,165,209,105,0,133,209,104,104,168,136,177,208,73
RLJ 100 DATA 128,145,208,136,16,247,96
RHJ 110 DIM NM$(30),PHONE1$(15),PHONE2$(15),ADDR$(78),MEMO$(75),M$(100)
CRJ 120 DIM C32$(50):C32$(1)=CHR$(32):C32$(50)=CHR$(32):C32$(2)=C32$
CEJ 130 DIM C21$(50):C21$(1)=CHR$(21):C21$(50)=CHR$(21):C21$(2)=C21$
NCJ 140 DIM C149$(50):C149$=CHR$(149):C149$(50)=CHR$(149):C149$(2)=C149$
UVJ 150 DIM DE$(20):DE$=CHR$(156):DE$(20)=CHR$(156):DE$(2)=DE$
AJJ 160 DIM ABC$(108):RESTORE 170:FOR I=1 TO 108:READ N:ABC$(I,I)=CHR$(N):NEXT I
MAJ 170 DATA 104,104,133,204,104,133,203,104,133,212,104,133,211,104,104,133
JNJ 180 DATA 209,165,203,133,207,165,204,133,208,162,0,134,210,134,213,232
HSJ 190 DATA 165,207,133,205,24,101,209,133,207,165,208,133,206,105,0,133
ATJ 200 DATA 208,160,0,177,207,209,205,240,4,144,9,176,27,200,196,209
MJJ 210 DATA 176,22,144,239,164,209,132,210,136,177,207,133,214,177,205,145
HRJ 220 DATA 207,165,214,145,205,136,16,241,232,208,2,230,213,228,211,208
HPJ 230 DATA 191,165,212,197,213,208,185,165,210,208,166,96
UWJ 240 OPEN #1,4,0,"K:":OPEN #2,9,0,"E:":GOSUB 250:GOTO 280
LEJ 250 GRAPHICS 0:POKE 16,64:POKE 53774,64:M$="ATARI TELEPHONE MASTER"
IVJ 260 GOSUB 700:POSITION 9,0:PRINT M$:POKE 85,6
JDJ 270 PRINT "COPYRIGHT 1986";CHR$(32);CHR$(32);"JEFF BRENNER":RETURN
FKJ 280 M$="RETURN":GOSUB 700:POKE 85,4:POKE 84,6
MCJ 290 PRINT "INSERT DATA DISK AND PRESS ";M$:POKE 752,1:PRINT DE$(1,4)
DUJ 300 POKE 764,255:GET #1,N:POKE 752,0
ADJ 310 TRAP 320:CLOSE #4:OPEN #4,4,0,"D:NAME.DAT":GOTO 390
WVJ 320 IF PEEK(195)<>170 AND PEEK(195)<>136 THEN GOSUB 720
FLJ 330 POKE 85,5:PRINT "NO PHONE FILE ON THIS DISKETTE."
HWJ 340 POKE 85,4:PRINT "CREATE A FILE ON THIS DISK (Y/N)?";
XYJ 350 GET #1,Q:PRINT CHR$(Q):IF Q=78 THEN 280
SYJ 360 IF Q<>89 THEN PRINT CHR$(28);CHR$(156);:GOTO 340
NVJ 370 CLOSE #4:OPEN #4,8,0,"D:NAME.DAT":CLOSE #4:OPEN #4,8,0,"D:PHONE.DAT"
WZJ 380 CLOSE #4:GOTO 460
UOJ 390 INPUT #4,NUM:NAME$="":FOR I=1 TO NUM
AXJ 400 INPUT #4;M$:NAME$(LEN(NAME$)+1)=M$:NEXT I:CLOSE #4
MRJ 410 TRAP 450:CLOSE #4:OPEN #4,6,0,"D:*.*"
TOJ 420 INPUT #4;M$:IF M$(5,8)<>"FREE" THEN 420
QLJ 430 MN=VAL(M$)*125/230:IF MN<MAX THEN MAX=INT(MN)
WWJ 440 CLOSE #4:GOTO 460
YDJ 450 CLOSE #4:MAX=NUM
YSJ 460 GOSUB 1810:POSITION 22,19:PRINT CHR$(198);"IND #";
YOJ 470 PRINT C32$(1,2);CHR$(193);"DD #"
AWJ 480 POSITION 22,20:PRINT CHR$(208);"RINT";C32$(1,3);CHR$(197);"DIT"
EEJ 490 POSITION 22,21:PRINT CHR$(209);"UIT";C32$(1,4);"# DIR"
LMJ 500 A=USR(ADR(INV$),32,21,1)
SNJ 510 GOSUB 670:CLOSE #3:POSITION 30,18:PRINT " ";CHR$(30);:CI=0
LUJ 520 CI=1-CI:A=USR(ADR(INV$),21,18,8):FOR DL=1 TO 10:NEXT DL
NBJ 530 IF PEEK(764)=255 THEN 520
NHJ 540 IF CI THEN A=USR(ADR(INV$),21,18,8)
PFJ 550 POKE 694,0:POKE 702,64:SE=0:GET #1,Q:IF Q>128 THEN Q=Q-128
PAJ 560 PRINT CHR$(Q):TRAP 40000
CAJ 570 IF Q=65 THEN EDIT=0:FIND=0:CLOSE #3:OPEN #3,9,0,"D:PHONE.DAT"
LEJ 580 IF Q=65 THEN GOSUB 760:GOSUB 2900
HZJ 590 IF Q=70 THEN GOSUB 2160:GOTO 510
YDJ 600 IF Q=81 THEN GRAPHICS 0:END
BMJ 610 IF Q=69 AND FIND THEN EDIT=1:GOSUB 2060:GOSUB 760:GOSUB 2900
MDJ 620 IF Q=68 THEN GOSUB 2980
LVJ 630 IF Q=80 THEN GOSUB 2680
BPJ 640 GOTO 510
WHJ 650 FOR FL=1 TO 10:A=USR(ADR(INV$),XF,YF,LF):FOR DLAY=1 TO 10:NEXT DLAY
WLJ 660 NEXT FL:RETURN
JAJ 670 POSITION 0,0:PRINT "NUM: ";NUM
IJJ 680 POSITION 0,2:PRINT "MAX: ";MAX
BFJ 690 RETURN
ESJ 700 FOR I=1 TO LEN(M$):M$(I,I)=CHR$(ASC(M$(I,I))+128):NEXT I:RETURN
EBJ 710 FOR I=19 TO 22:POSITION 21,I:PRINT C32$(1,15);:NEXT I:RETURN
PPJ 720 PRINT CHR$(253);"ERROR #";PEEK(195);
RTJ 730 PRINT :PRINT "       PRESS       TO CONTINUE"
PUJ 740 IF PEEK(53279)<>6 THEN 740
UEJ 750 GRAPHICS 0:RUN
NIJ 760 POSITION 21,22:PRINT CHR$(32);"ESC WHEN DONE";CHR$(32);
CGJ 770 A=USR(ADR(INV$),22,22,3):IF EDIT THEN 830
BMJ 780 POSITION 7,4:PRINT C32$(1,26);:POSITION 4,8:PRINT C32$(1,15);
DHJ 790 POSITION 4,8:PRINT C32$(1,15);:POSITION 21,8:PRINT C32$(1,15);
FAJ 800 POSITION 21,8:PRINT C32$(1,15);
GOJ 810 FOR I=12 TO 14:POSITION 7,I:PRINT C32$(1,26);:NEXT I
GPJ 820 FOR I=18 TO 22:POSITION 4,I:PRINT C32$(1,15);:NEXT I
YJJ 830 POSITION 7,4:L=33:Z=26:ST=1:GOSUB 920
YOJ 840 POSITION 4,8:L=19:Z=15:ST=2:GOSUB 920
BKJ 850 POSITION 21,8:L=36:Z=15:ST=3:GOSUB 920
BKJ 860 POSITION 7,12:L=33:Z=26:ST=4:GOSUB 920
BRJ 870 POSITION 4,18:L=19:Z=15:ST=5:GOSUB 920
DJJ 880 POSITION 30,18:PRINT CHR$(32)
HNJ 890 GOSUB 1330:GOSUB 1910
VWJ 900 IF E<>27 AND EDIT=0 THEN 760
BAJ 910 RETURN
NSJ 920 YH=PEEK(84):XH=PEEK(85):POKE 752,0
EZJ 930 KC=-1:PRINT CHR$(30);CHR$(31);:POKE 764,255
KDJ 940 IF PEEK(93)=213 THEN PRINT CHR$(28);CHR$(31);
PFJ 950 C=PEEK(53279):IF PEEK(764)=255 AND C<>5 THEN 950
IQJ 960 IF SE OR C<>5 THEN 990
WVJ 970 SOUND 1,0,6,8:IF PEEK(53279)<>7 THEN 970
HJJ 980 SOUND 1,0,0,0:RETURN
HIJ 990 POKE 694,0:POKE 702,64
MNJ 1000 GET #1,E:KC=KC+1:IF E=27 AND SE THEN RETURN
MWJ 1010 IF E=27 AND PEEK(84)=4 AND PEEK(85)=7 THEN POP :GOTO 900
VCJ 1020 IF E=27 THEN POP :GOTO 880
COJ 1030 IF E>31 AND E<91 AND PEEK(93)<>89 THEN PRINT CHR$(E);:GOTO 940
YVJ 1040 IF E=127 THEN E=31
BDJ 1050 IF E<>156 THEN 1070
GWJ 1060 POKE 85,XH:PRINT C32$(1,L-XH);:POKE 85,XH:PRINT CE$;:GOTO 940
XPJ 1070 IF E<255 THEN 1100
AGJ 1080 T=PEEK(85):POKE 85,L-1:PRINT CHR$(254);:POKE 85,T
GBJ 1090 PRINT CHR$(255);CE$;
AVJ 1100 IF E<>254 THEN 1130
PUJ 1110 T=PEEK(85):PRINT CHR$(254);:POKE 85,L-1:PRINT CHR$(255);
IUJ 1120 POKE 85,T:PRINT CE$;
NDJ 1130 IF E<28 OR E>31 AND E<>155 THEN 1230
MCJ 1140 XT=PEEK(85):YT=PEEK(84):PRINT CHR$(E);CE$;
KZJ 1150 IF E=155 THEN POKE 85,XH:XT=XH:PRINT CE$;
IMJ 1160 U=PEEK(93)
OWJ 1170 IF KC=0 THEN GOSUB 1320:IF M$(1,Z)=C32$(1,Z) THEN RETURN
COJ 1180 IF E=155 THEN KC=-1
UBJ 1190 IF U<>89 AND U<>85 AND U<128 THEN 1230
JKJ 1200 IF E=155 THEN RETURN
XTJ 1210 IF E=155 THEN 1270
OVJ 1220 POKE 85,XT:POKE 84,YT:PRINT CE$;
BCJ 1230 IF E<>126 THEN 1270
YRJ 1240 XT=PEEK(85):POKE 85,XT-1:PRINT CE$;:U=PEEK(93):POKE 85,XT
CNJ 1250 IF U=89 OR U=85 OR U>127 THEN PRINT CE$;:GOTO 1280
SUJ 1260 PRINT CHR$(E);
DSJ 1270 GOTO 940
SDJ 1280 IF ST=4 AND PEEK(84)>12 THEN POKE 84,PEEK(84)-1:PRINT CE$;:GOTO 1270
SLJ 1290 IF ST=5 AND PEEK(84)>18 THEN POKE 84,PEEK(84)-1:PRINT CE$;:GOTO 1270
SJJ 1300 IF ST>1 THEN POP :ON ST GOTO 830,830,840,850,860
FGJ 1310 GOTO 1270
OHJ 1320 POKE 84,YT:INPUT #2;M$:POKE 85,XT:PRINT CE$;:RETURN
CDJ 1330 POSITION 7,4:INPUT #2;NM$:A=USR(ADR(INV$),7,4,26)
HUJ 1340 POSITION 4,8:INPUT #2;PHONE1$
ONJ 1350 A=USR(ADR(INV$),4,8,15):POSITION 21,8:INPUT #2;PHONE2$
NVJ 1360 A=USR(ADR(INV$),21,8,15)
XPJ 1370 ADDR$="":FOR I=12 TO 14:POSITION 7,I:INPUT #2;M$
MYJ 1380 A=USR(ADR(INV$),7,I,26)
NIJ 1390 ADDR$(LEN(ADDR$)+1)=M$(1,26):NEXT I
YEJ 1400 MEMO$="":FOR I=18 TO 22:POSITION 4,I:INPUT #2;M$
MNJ 1410 A=USR(ADR(INV$),4,I,15)
OMJ 1420 MEMO$(LEN(MEMO$)+1)=M$(1,15):NEXT I
MBJ 1430 NM$=NM$(1,26)
XXJ 1440 FOR I=LEN(NM$) TO 1 STEP -1:IF NM$(I,I)=CHR$(32) THEN NEXT I
TYJ 1450 IF I=1 THEN 1510
NWJ 1460 FOR J=I-1 TO 1 STEP -1:IF NM$(J,J)<>CHR$(32) THEN NEXT J
UBJ 1470 IF J<2 THEN 1510
LBJ 1480 M$=NM$(J+1,I):M$(LEN(M$)+1)=CHR$(32)
MVJ 1490 M$(LEN(M$)+1)=NM$(1,J-1):IF I<26 THEN M$(LEN(M$)+1)=NM$(I+1)
XHJ 1500 NM$=M$
USJ 1510 INV=ADR(INV$):A=USR(INV,7,4,26):A=USR(INV,4,8,15):A=USR(INV,21,8,15)
CMJ 1520 FOR I=12 TO 14:A=USR(INV,7,I,26):NEXT I
XFJ 1530 FOR I=18 TO 22:A=USR(INV,4,I,15):NEXT I:RETURN
FNJ 1540 DATA 6,2,9,21,26,15,155
JKJ 1550 DATA 6,3,153,32,26,25,155
DBJ 1560 DATA 6,4,11,149,11,206,193,205,197,149,11,12,155
JXJ 1570 DATA 2,5,155
BGJ 1580 DATA 3,6,9,21,15,15,9,21,15,15,155
IYJ 1590 DATA 3,7,153,32,15,25,153,32,15,25,155
WIJ 1600 DATA 3,8,11,149,4,208,200,207,206,197,160,177
GWJ 1610 DATA 149,4,12,11,149,4,208,200,207,206,197,160,178
TJJ 1620 DATA 149,4,12,155
JYJ 1630 DATA 2,9,155
HJJ 1640 DATA 6,10,9,21,26,15,155
LGJ 1650 DATA 6,11,153,32,26,25,155
LIJ 1660 DATA 6,12,153,32,26,25,155
LKJ 1670 DATA 6,13,153,32,26,25,155
YWJ 1680 DATA 6,14,11,149,9,193,196,196,210,197,211,211
VJJ 1690 DATA 149,10,12,155
LPJ 1700 DATA 2,15,155
CYJ 1710 DATA 3,16,9,21,15,15,9,21,15,15,155
LDJ 1720 DATA 3,17,153,32,15,25,153
OVJ 1730 DATA 67,79,77,77,65,78,68,58,32,7,25,155
KTJ 1740 DATA 3,18,153,32,15,25,153,32,15,25,155
KVJ 1750 DATA 3,19,153,32,15,25,153,32,15,25,155
KOJ 1760 DATA 3,20,153,32,15,25,153,32,15,25,155
KQJ 1770 DATA 3,21,153,32,15,25,153,32,15,25,155
UMJ 1780 DATA 3,22,11,149,5,206,207,212,197,211,149,5
UXJ 1790 DATA 12,11,149,2,195,207,205,205,193,206,196
YTJ 1800 DATA 160,194,207,216,149,2,12,255
NNJ 1810 RESTORE 1540:GOSUB 250
TUJ 1820 READ X,Y:POSITION X,Y+1
QFJ 1830 N=0:READ C:IF C=32 OR C=21 OR C=149 THEN READ N:GOTO 1870
JTJ 1840 IF C=255 THEN RETURN
NBJ 1850 PRINT CHR$(C);:IF C<>155 THEN 1830
FRJ 1860 GOTO 1820
APJ 1870 IF C=32 THEN PRINT C32$(1,N);
AMJ 1880 IF C=21 THEN PRINT C21$(1,N);
FBJ 1890 IF C=149 THEN PRINT C149$(1,N);
FNJ 1900 GOTO 1830
VGJ 1910 IF EDIT=0 THEN NUM=NUM+1:IF NUM>MAX THEN 2030
TPJ 1920 IF EDIT THEN HNUM=NUM:NUM=FIND:POINT #3,S,B:GOTO 1940
IEJ 1930 TRAP 2050:NOTE #3,S,B
UFJ 1940 HS=INT(S/256):LS=S-256*HS:FIND=NUM
URJ 1950 NM$(LEN(NM$)+1)=CHR$(HS):NM$(LEN(NM$)+1)=CHR$(LS)
KOJ 1960 NM$(LEN(NM$)+1)=CHR$(B)
WKJ 1970 NAME$(NUM*29-28,NUM*29)=NM$
YIJ 1980 IF NUM>1 THEN A=USR(ADR(ABC$),ADR(NAME$),NUM,29)
QUJ 1990 PRINT #3;PHONE1$:PRINT #3;PHONE2$
FTJ 2000 PRINT #3;ADDR$:PRINT #3;MEMO$
OWJ 2010 IF EDIT THEN NUM=HNUM
COJ 2020 RETURN
MVJ 2030 POSITION 21,22:PRINT "TOO MANY NAMES ":A=USR(ADR(INV$),21,22,14)
CSJ 2040 RETURN
VKJ 2050 POSITION 21,22:PRINT "ERROR ";PEEK(195);C32$(1,6);:RETURN
JFJ 2060 OPEN #3,12,0,"D:PHONE.DAT":M$=NAME$(FIND*29-28,FIND*29)
FKJ 2070 HS=ASC(M$(LEN(M$)-2)):LS=ASC(M$(LEN(M$)-1))
DIJ 2080 B=ASC(M$(LEN(M$))):S=HS*256+LS
IYJ 2090 POINT #3,S,B:RETURN
AQJ 2100 NM$=NAME$(FIND*29-28,FIND*29)
RFJ 2110 HS=ASC(NM$(LEN(NM$)-2)):LS=ASC(NM$(LEN(NM$)-1))
OCJ 2120 B=ASC(NM$(LEN(NM$))):S=HS*256+LS:NM$=NM$(1,26)
SUJ 2130 CLOSE #3:OPEN #3,4,0,"D:PHONE.DAT":POINT #3,S,B
PRJ 2140 INPUT #3;PHONE1$:INPUT #3;PHONE2$:INPUT #3;ADDR$:INPUT #3;MEMO$
XYJ 2150 CLOSE #3:RETURN
KWJ 2160 POKE 752,1:POSITION 21,22:PRINT "TYPE NAME";C32$(1,6);:POKE 752,0
WTJ 2170 XF=21:YF=22:LF=9:GOSUB 650
DEJ 2180 POSITION 7,4:PRINT C32$(1,26);:POSITION 4,8:PRINT C32$(1,15);
EZJ 2190 POSITION 4,8:PRINT C32$(1,15);:POSITION 21,8:PRINT C32$(1,15);
GSJ 2200 POSITION 21,8:PRINT C32$(1,15);
IGJ 2210 FOR I=12 TO 14:POSITION 7,I:PRINT C32$(1,26);:NEXT I
IHJ 2220 FOR I=18 TO 22:POSITION 4,I:PRINT C32$(1,15);:NEXT I
NJJ 2230 POSITION 7,4:L=33:Z=26:ST=1:SE=1:GOSUB 920
HLJ 2240 POKE 752,1:POSITION 21,22:PRINT "PLEASE STAND BY";
PMJ 2250 A=USR(ADR(INV$),21,22,15)
CIJ 2260 POSITION 7,4:INPUT #2;NM$:NM$=NM$(1,26)
IGJ 2270 FOR I=LEN(NM$) TO 1 STEP -1:IF NM$(I,I)=CHR$(32) THEN NEXT I:I=1
PXJ 2280 IF I=1 THEN LNM=LEN(NM$):GOTO 2350
NYJ 2290 FOR J=I-1 TO 1 STEP -1:IF NM$(J,J)<>CHR$(32) THEN NEXT J
YJJ 2300 IF J<2 THEN M$=NM$:GOTO 2330
KUJ 2310 M$=NM$(J+1,I):M$(LEN(M$)+1)=CHR$(32)
```

continued on page 206

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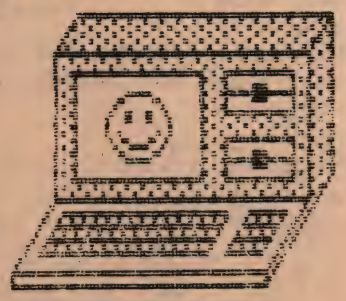

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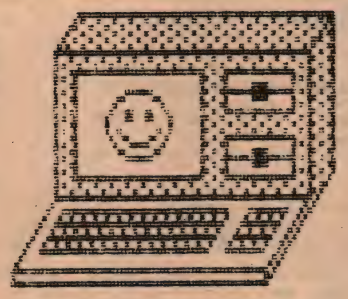

Save Sanyo
continued from page 88

have a color monitor, you can still use the program, of course, but you won't get the colors.

Any program that saves the screen has to begin at the beginning. We have to know where our video screen starts. Now we've all read our *Sanyo Operator's Guide*. Concerning the video RAM, I must say, this book is a masterpiece of terse obscurity. It devotes a single page to an explanation of the Sanyo's video configuration. One page for this heavy subject. I literally memorized the few lines on page 5-39, trying to understand it. I never did, that way. What I have learned is from trial and error. Error, mostly.

Try this, for instance. If you'd like to see where your screen begins, type DEBUG. When the prompt appears, type D40:107A. At this memory location you'll see the start of the video. If you're using the 3C00:0000 screen, which Sanyo calls page 2, you might see 00 00 00 3C. That means that your screen memory at the moment starts at 3C00:0000. Yes, it does. Believe me.

Okay, you don't believe me. You want me to prove it. You say, "If what you tell me is right, then I can type E3C00:0, then enter "F", and a big dot will appear at the upper left hand corner of my screen." So you do all that, and the bar pops up in the middle of the screen. Am I wrong? No, I'm not. Let me explain. You see, you are writing to the screen at the time you are examining the memory at 40:107A. As DEBUG displays the memory dump, you are actually scrolling the screen down. Therefore, you'll never find the beginning of screen memory this way. It's impossible.

But there is a way to do it. And I can prove to you that I'm right; 40:107A does contain the start of video memory. It's not complicated, but it does require another computer and the MSDOS command CTTY AUX.

Okay, get yourself another computer. Borrow a friend's if you have to. Then connect your Sanyo to the second computer, using the RS232 serial ports and a null modem connector. You'll need the null modem connector because personal computers are always configured for DTE operation. A DTE device cannot communicate with another DTE device without a little help. The null modem connector supplies that help.

Load a terminal program into the second computer. Then, making sure the baud rate, parity, etc., are both compatible, type CTTY AUX on the Sanyo's keyboard. Hit ENTER on the Sanyo keys, and the MSDOS prompt should appear on the second computer's CRT. If it doesn't, you've done something wrong; go back and check your connectors.

But supposing, by some miracle, everything is working right. You are now controlling your Sanyo from the second computer. Try typing DIR, and you see the Sanyo's disk directory appear on this CRT.

Now, on this keyboard, type DEBUG, hit ENTER, and when DEBUG loads, all screen and keyboard operations will be conducted from the second

continued on page 208

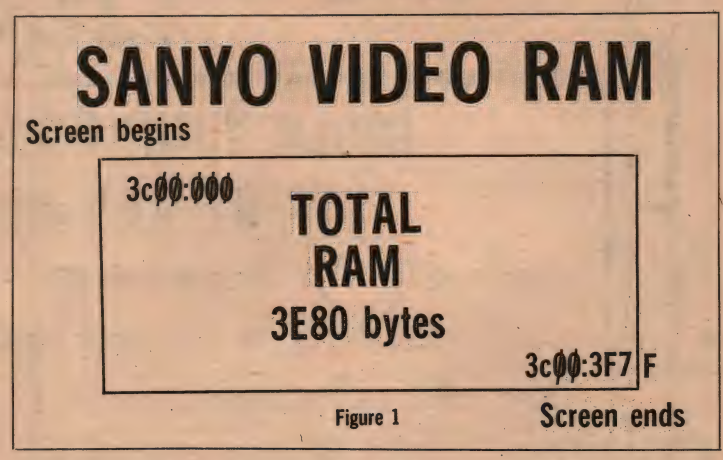

Figure 1

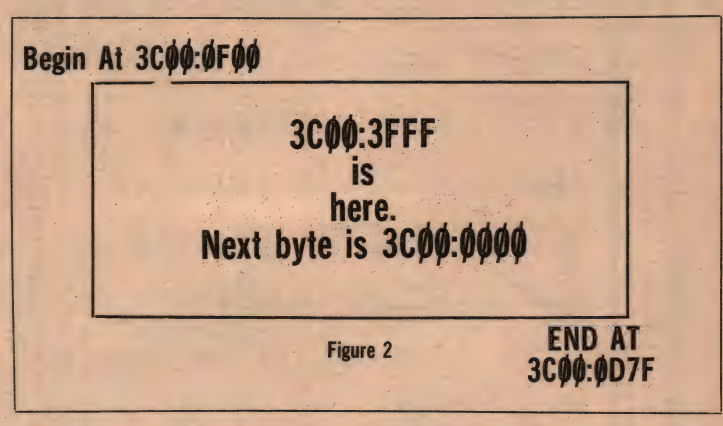

Figure 2

Atari Telephone Master Program
continued from page 204

```
MOJ 2320 M$(LEN(M$)+1)=NM$(1,J-1):IF I<26 THEN M$(LEN(M$)+1)=NM$(I+1)
PDJ 2330 NM$=M$:FOR I=LEN(NM$) TO 1 STEP -1:IF NM$(I,I)=CHR$(32) THEN NEXT I
YYJ 2340 IF I>1 THEN NM$=NM$(1,I-1):LNM=LEN(NM$)
GQJ 2350 IF NM$=NAME$(1,LNM) THEN FIND=1:GOTO 2440
UQJ 2360 F=1:L=NUM:KT=0
HPJ 2370 OL=FIND:FIND=INT(F+(L-F)/2+0.5)
JDJ 2380 IF OL=FIND THEN KT=KT+1:IF KT>3 THEN 2600
VBJ 2390 IF NM$=NAME$(FIND$29-28,FIND$29-29+LNM) THEN 2440
CNJ 2400 IF NM$<NAME$(FIND$29-28,FIND$29-29+LNM) THEN L=FIND:GOTO 2420
ALJ 2410 F=FIND
UJJ 2420 IF L-F THEN 2370
FIJ 2430 GOTO 2600
DWJ 2440 GOSUB 2100:IF LNM=26 THEN 2500
GOJ 2450 FOR I=1 TO LEN(NM$):IF NM$(I,I)<>CHR$(32) THEN NEXT I:GOTO 2490
DEJ 2460 IF I=1 OR I=LEN(NM$) THEN 2490
DKJ 2470 M$=NM$(I+1,LEN(NM$)):GOSUB 2570:M$(LEN(M$)+1)=CHR$(32)
ARJ 2480 M$(LEN(M$)+1)=NM$(1,I-1):NM$=M$
REJ 2490 POSITION 7,4:PRINT C32$(1,26);:POSITION 7,4:PRINT NM$;
JHJ 2500 POSITION 21,22:PRINT "FOUND";C32$(1,10);:A=USR(ADR(INV$),21,22,5)
EKJ 2510 POSITION 4,8:PRINT PHONE1$;
GRJ 2520 POSITION 21,8:PRINT PHONE2$;:FOR II=1 TO 3:POSITION 7,11+II
TTJ 2530 PRINT ADDR$(II*26-25,II*26);:NEXT II
HUJ 2540 FOR II=1 TO 5:POSITION 4,17+II
UIJ 2550 PRINT MEMO$(II*15-14,II*15);:NEXT II
CZJ 2560 RETURN
EIJ 2570 FOR II=LEN(M$) TO 1 STEP -1:IF M$(II,II)=CHR$(32) THEN NEXT II
QKJ 2580 IF II=LEN(M$) OR II=1 THEN RETURN
DRJ 2590 M$=M$(1,II):RETURN
LFJ 2600 POKE 752,1:POSITION 21,22:PRINT "NOT FOUND";C32$(1,6);:POKE 752,0
KYJ 2610 XF=21:YF=22:LF=9:GOSUB 650:FIND=0:RETURN
OSJ 2620 CLOSE #3:OPEN #3,12,0,"D:PHONE.DAT"
PMJ 2630 HS=ASC(NM$(LEN(NM$))):LS=ASC(NM$(LEN(NM$)-1)):B=ASC(NM$(LEN(NM$)-2))
OTJ 2640 A=USR(ADR(ABC$),ADR(NAME$),NUM,29)
RMJ 2650 S=HS*256+LS:POINT #3,S,B
PMJ 2660 PRINT #3;PHONE1$:PRINT #3;PHONE2$:PRINT #3;ADDR$:PRINT #3;MEMO$
YFJ 2670 CLOSE #3:RETURN
KNJ 2680 POSITION 21,22:POKE 752,1:PRINT "PRINTING";C32$(1,7);
THJ 2690 A=USR(ADR(INV$),21,22,8):TRAP 2880:CLOSE #4:OPEN #4,8,0,"P:"
EBJ 2700 PRINT #4;"NAME/ADDRESS";C32$(1,15);"PHONE 1";C32$(1,9);"PHONE 2";
SGJ 2710 PRINT #4;C32$(1,9);"NOTES"
FYJ 2720 PRINT #4;"--------------";C32$(1,15);"--------";C32$(1,9);"--------";
LWJ 2730 PRINT #4;C32$(1,9);"-----"
CJJ 2740 POSITION 7,4:INPUT #2;NM$:A=USR(ADR(INV$),7,4,26)
IOJ 2750 IF LEN(NM$)>26 THEN NM$=NM$(1,26)
MXJ 2760 POSITION 4,8:INPUT #2;PHONE1$:A=USR(ADR(INV$),4,8,15)
QPJ 2770 POSITION 21,8:INPUT #2;PHONE2$:A=USR(ADR(INV$),21,8,15)
LDJ 2780 PRINT #4:PRINT #4;NM$;CHR$(32);PHONE1$;CHR$(32);PHONE2$;CHR$(32);
KXJ 2790 POSITION 4,18:INPUT #2;M$:PRINT #4;M$(1,15)
JUJ 2800 FOR I=12 TO 14:POSITION 7,I:INPUT #2;M$:A=USR(ADR(INV$),7,I,26)
KPJ 2810 PRINT #4;M$(1,26);:POSITION 4,I+7:INPUT #2;M$:PRINT #4;C32$(1,33);
PCJ 2820 PRINT #4;M$(1,15):NEXT I
AFJ 2830 POSITION 4,22:INPUT #2;M$:PRINT #4;C32$(1,50);C32$(1,9);M$(1,15)
RBJ 2840 A=USR(ADR(INV$),7,4,26):A=USR(ADR(INV$),4,8,15)
OAJ 2850 A=USR(ADR(INV$),21,8,15)
YVJ 2860 FOR I=12 TO 14:POSITION 7,I:A=USR(ADR(INV$),7,I,26):NEXT I
WWJ 2870 PRINT #4:CLOSE #4:POSITION 21,22:PRINT C32$(1,15);:RETURN
BCJ 2880 POSITION 21,22:PRINT "ERROR ";PEEK(195);C32$(1,5);
SUJ 2890 XF=21:YF=22:LF=9:GOSUB 650:RETURN
ICJ 2900 TRAP 2930:CLOSE #4:OPEN #4,8,0,"D:NAME.DAT"
DEJ 2910 PRINT #4;NUM:FOR I=1 TO NUM
DKJ 2920 PRINT #4;NAME$(I*29-28,I*29):NEXT I:CLOSE #4:CLOSE #3:RETURN
AVJ 2930 PRINT "ERROR #";PEEK(195);"."
VKJ 2940 POKE 752,1:PRINT "PRESS START TO CONTINUE";:Y=PEEK(84)
LVJ 2950 A=USR(ADR(INV$),9,Y,5)
TZJ 2960 IF PEEK(53279)<>7 THEN 2960
FUJ 2970 GOTO 2900
MUJ 2980 TRAP 2880:CLOSE #4:OPEN #4,8,0,"P:"
URJ 2990 POSITION 21,22:PRINT "ESC TO STOP";C32$(1,4);:POKE 764,255
NHJ 3000 A=USR(ADR(INV$),21,22,3)
MRJ 3010 CLOSE #3:OPEN #3,4,0,"D:PHONE.DAT"
DXJ 3020 PRINT #4;"NAME/ADDRESS";C32$(1,15);"PHONE 1";C32$(1,9);"PHONE 2";
SCJ 3030 PRINT #4;C32$(1,9);"NOTES"
FUJ 3040 PRINT #4;"--------------";C32$(1,15);"--------";C32$(1,9);"--------";
LSJ 3050 PRINT #4;C32$(1,9);"-----"
VPJ 3060 FOR I=1 TO NUM:NM$=NAME$(I*29-28,I*29)
RDJ 3070 IF PEEK(764)<>28 THEN 3100
MLJ 3080 POSITION 21,22:PRINT "INTERRUPTED";C32$(1,4);:XF=21:YF=22:LF=11
XIJ 3090 GOSUB 650:CLOSE #4:RETURN
RFJ 3100 HS=ASC(NM$(LEN(NM$)-2)):LS=ASC(NM$(LEN(NM$)-1))
OCJ 3110 B=ASC(NM$(LEN(NM$))):S=HS*256+LS:NM$=NM$(1,26)
KDJ 3120 POINT #3,S,B:PRINT #4
PRJ 3130 INPUT #3;PHONE1$:INPUT #3;PHONE2$:INPUT #3;ADDR$:INPUT #3;MEMO$
KFJ 3140 PRINT #4;NM$;CHR$(32);
IPJ 3150 PRINT #4;PHONE1$;CHR$(32);PHONE2$;CHR$(32);MEMO$(1,15)
YIJ 3160 FOR J=1 TO 3:PRINT #4;ADDR$(J*26-25,J*26);C32$(1,33);
SVJ 3170 PRINT #4;MEMO$(J*15+1,J*15+15):NEXT J
PTJ 3180 PRINT #4;C32$(1,50);C32$(1,9);MEMO$(61,75):NEXT I
YUZ 3190 CLOSE #4:RETURN
```

Parrot Sound
continued from page 78

sound files that have been organized into tracks are referred to as structured files. A typical track is created by examining a graph of the sampled sound, determining the memory locations of the beginning and end points of the actual sound segment that is desired, and then defining those memory locations as one of the tracks. With practice, you could even cut out a single note of an instrument from a song and define it as a track. The Emulator program also lets advanced users actually modify the sound waves on the screen with the joystick.

Once your tracks are defined, you can play music with your sampled sounds. The first three rows of the keyboard are defined as musical keys, while the bottom row is used to select one of the nine tracks.

A generous number of sample structured sounds are included on the Parrot diskette. These sounds include a variety of drums, a piano, horn, guitar, starting cars and barking dogs. Playing these sounds on the keyboard is enormous fun, and playing your own sounds is even more exciting.

BASIC Subroutine

The Parrot diskette contains a BASIC subroutine that allows you to put your sampled sounds into your own BASIC programs. On the diskette is also a guess-the-number game (higher, lower, a little higher, etc.) which demonstrates how this subroutine can be used in your own programs.

Documentation

The 39-page instruction booklet is complete and well written. Special sections discuss creating custom sounds, using sound files in your BASIC programs, and storing sounds on a 130XE. The appendices include a trouble-shooting guide, sample "sheet music" songs for the keyboard, a description of waves, and a glossary of terms.

Conclusions

While my first impressions of the Parrot were negative, the software included with the package quickly changed my mind. And despite the homemade looks of the Parrot hardware, the sampled sounds are of comparable quality to the more attractive and expensive Voice Master. I would like to have seen a music-writing program or a voice recognition program, like those included with voice Master, but perhaps Alpha Systems will release additional software for the Parrot in the future.

If you're itching for a sound digitizer, and don't mind that someone might try to use it as a game paddle, the parrot should suit your needs. At $39.95, the package is a great value.

Requires:
8-Bit Atari Computer
Disk Drive
Joystick

Author:
Tony Ramos

Price:
$39.95

Warranty:
90 days, free replacement

Manufacturer:
Alpha Systems
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Stow, OH 44224

Ratings For Parrot Sound Digitizer Package

*Poor, **Fair, ***Good, ****Excellent

Design: Hardware	*
Design: Software	***
Practicality	***
Documentation	****
Value for price	****
Average	***

Computers And Dyslexia continued from page 203

(by Aston-Tate) which he found was capable of doing practically everything that he needed for all his school work. He became addicted to FRAMEWORK's word-processing program, and adopted it as his primary writing resource. He became infatuated with the dynamic outlining as an integral part of the act of composition.

He was spending many hours struggling with the act of creation. Not making a lot of progress but clearly having a grand time doing what had been thought to be beyond his capacity for so many years. One of the most exciting days in his life saw the discovery of TURBO LIGHTNING (by Borland).

Another student had just purchased the program and Elliot watched in disbelief as it worked. LIGHTNING loads into memory at bootup and remains resident there regardless of what program is active on the monitor. Whenever a word is misspelled, the beeper sounds. If the user wishes, the word is looked up in the dictionary. A little window shows the correct spelling. With a keystroke, the misspelled word is corrected in the text and the window disappears. At the user's bidding, a screenful of words can be checked at any time. The incorrect ones will be highlighted and can, by moving the cursor and pressing a key, be looked up and corrected.

There are two dictionaries supplied: one to work from floppy which contains about 40,000 words, and one to work from hard disk, which contains the entire *Random House Dictionary of the English Language,* about 75,000 words. Similarly, there are two thesauruses of a like size that work in the same way. The larger of the two contains the entire *Random House Thesaurus.*

And the program really loads and runs "like lightning." I don't know how Borland does it, but they manage to write programs that seem to be actually turbo-driven, doing things not only better, but also faster by a substantial factor than the competition. Elliot was thrilled and went out to buy the speller as soon as he had the $99. FRAMEWORK and TURBO LIGHTNING became his boon companions and his chief writing tools. That happened a couple of months ago and his commitment to them remains strong to this writing.

He did not need the instant beep. Too many of his first attempts at a word were faulty. But the screen checker is his mainstay. The program, unlike other spellers, has a strong dose of artificial intelligence. It can search for words whose first letters are wrong, but which "sound like" other words, using elements from the other syllables. In addition, it will search for spelling of words which have two transposed letters, a common typographical error. And all in the twinkle of an eye!.

Conclusions

These events occurred over the last 24 months. Elliot is a changed person. He has managed to get through several courses, with decent grades, without ever claiming his rights under the Rehabilitation Act of 1973. Many of his recent teachers have no idea that he is in any way learning-disabled. And he is having a much easier time writing cursive or reading print on paper. The latter is going much better than the former, but this is the first real progress he has made at all. He was so proud of his B in Rhetoric and the 15-page paper that he wrote all by himself (with the help of a PC and well-selected software!).

Because of the importance of Elliot's experience, I thought it appropriate that I write this article and publish it for others. Certainly his is not an isolated case. So few dyslexics get to college it may be difficult to find anyone to whom to apply the same treatment. But I am sure younger victims might be helped by a similar experience. Computer-assisted learning is already available to them, but perhaps without the same emphasis on the use of sophisticated word processing. In any case, I am convinced that some combination of software and experience will produce similar results for others, and others are making the same discovery. The computer is uniquely capable of leading the college-age dyslexia to new hope and of opening the doors of many minds... ●

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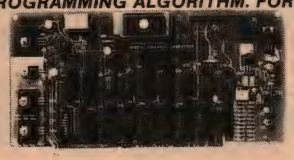

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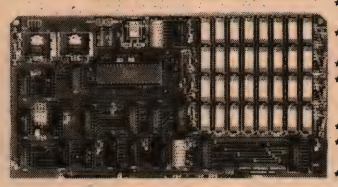

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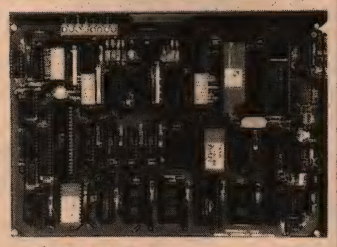

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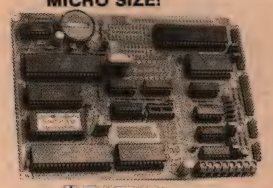

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Save Sanyo
continued from page 206

PROGRAM LISTING ONE

```
FCB             SEGMENT
DRIVE_NUM       DB      ?                       ; drive to save on
FILE_NAME       DB      8 DUP (?)               ; 8 letters of program name
FILE_EXT        DB      3 DUP (?)               ; file extension
CONTROL_BLK     DW      ?
RECORD_SIZE     DW      ?                       ; size of each record
FILE_SIZE_LO    DW      ?
FILE_SIZE_HI    DW      ?
DATE            DW      ?
TIME            DW      ?
DOS_USE         DB      8 DUP(?)
CURRENT_REC     DB      ?
RANDOM_LO       DW      ?
RANDOM_HI       DW      ?
BUFFER          DB      100H DUP(' ')           ; where we put the data
ERROR           DB      'ERROR'                 ; error message
                DB      '$'                     ; end of message sign
FCB             ENDS
                ;
                ; save the screen to disk
                ;
APROG   SEGMENT
        ASSUME CS:APROG,DS:FCB
PROG            PROC    FAR
                PUSH    CS                      ; save the code segment
                POP     BP                      ; move into BP
                ADD     BP,0EH                  ; adjust for FCB
                MOV     DS,BP                   ; DS now contains FCB segment
                LEA     DX,BUFFER       ; DX must contain buffer address
                MOV     AH,1AH          ; set disk transfer address
                INT     21H             ; with interrupt 21
                LEA     DX,DRIVE_NUM            ; FCB address
                CALL    CREATE_FILE             ; file doesn't exist, so create
                MOV     RECORD_SIZE,100H        ; number of bytes to write
                MOV     CURRENT_REC,0           ; start at first record
                CALL    VIDEO_SOR               ; get start address of video
                MOV     SI,AX                   ; video address
                MOV     AX,[107CH]              ; video segment
                MOV     DS,AX           ; move into DS
                MOV     ES,BP           ; buffer segment
                MOV     BX,3FH          ; number of 100 byte blocks to move
STILMOR:
                LEA     DI,BUFFER       ; buffer address is destination
                MOV     CX,100H         ; move 100 bytes on each move
AGAIN:
                MOVSB                   ; move one of 'em
                AND     SI,3FFFH        ; is this the end of the video screen?
                LOOP    AGAIN           ; no; go back and get some more bytes
                PUSH    DS              ; save this
                CALL    WRITE_FILE      ; write 100 bytes
                POP     DS              ; get the DS back
                DEC     BX              ; decrease BX register by one
                JNZ     STILMOR         ; not enough, go back for more
                CALL    CLOSE_FILE      ; close the file
                RETF                    ; go back to BASIC
                ; read the file and put on screen
                ;
                PUSH    CS              ; save the CS
                POP     BP              ; move into BP
                ADD     BP,0FH          ; adjust for FCB segment
                MOV     DS,BP           ; move FCB segment into DS
                LEA     DX,BUFFER       ; DX must contain buffer address
                MOV     AH,1AH          ; set disk transfer address
                INT     21H             ; with interrupt 21
                LEA     DX,DRIVE_NUM    ; FCB address must be in DX
                CALL    OPEN_FILE               ; file already exists, so open
                MOV     RECORD_SIZE,100H        ; read 100H bytes each time
                CALL    VIDEO_SOR               ; find the video start address
                MOV     DI,AX                   ; video start into DI
                MOV     AX,[107CH]              ; video segment
                MOV     ES,AX
                MOV     DS,BP                   ; buffer segment
                MOV     BX,3FH                  ; number of 100 byte blocks
YETMO:
                CALL    READ_FILE               ; read file data into buffer
                LEA     SI,BUFFER               ; buffer address into SI
                MOV     CX,100H                 ; number of bytes to move
MORE:
                MOVSB                           ; move it
                AND     DI,3FFFH                ; end of video screen
                LOOP    MORE                    ; read till finished
                DEC     BX                      ; decrease block by one
                JNZ     YETMO                   ; no, go back and get more
                CALL    CLOSE_FILE              ; close the file with int 21
                RETF                            ; go back to BASIC
PROG            ENDP
CREATE_FILE     PROC    NEAR
                MOV     AH,16H                  ; load DOS function call
                INT     21H
                OR      AL,AL                   ; is there an error?
                JNZ     ERROR_MES               ; if so, then jump to message
                RET                             ; otherwise, return
CREATE_FILE     ENDP
WRITE_FILE      PROC    NEAR
                MOV     DS,BP                   ; buffer address segment
                MOV     AH,15H                  ; DOS function call
                INT     21H
                OR      AL,AL                   ; error?
                JNZ     ERROR_MES               ; yes, then print message
                RET
WRITE_FILE      ENDP
CLOSE_FILE      PROC    NEAR
                MOV     DS,BP                   ; buffer address segment
                MOV     AH,10H                  ; DOS function call
                INT     21H
                OR      AL,AL                   ; error?
                JNZ     ERROR_MES
                RET
CLOSE_FILE      ENDP
OPEN_FILE       PROC    NEAR
                MOV     AH,0FH                  ; DOS function call
                INT     21H
                OR      AL,AL                   ; error?
                JNZ     ERROR_MES
                RET
OPEN_FILE       ENDP
READ_FILE       PROC    NEAR
                MOV     AH,14H                  ; DOS function call
                INT     21H
                OR      AL,AL                   ; error?
                JNZ     ERROR_MES               ; yes, then print message
                RET
READ_FILE       ENDP
ERROR_MES       PROC    NEAR
                LEA     DX,ERROR                ; address of error message
                MOV     AH,09H                  ; DOS function call
                INT     21H                     ; put on screen
                POP     AX                      ; empty the stack
                RETF                            ; go back to BASIC
ERROR_MES       ENDP
VIDEO_SOR       PROC    NEAR
                MOV     AX,40H                  ; location of video segment
                MOV     DS,AX                   ; into DS
                MOV     SI,107AH                ; video start location
                MOV     AX,[SI]
                RET
VIDEO_SOR       ENDP
APROG           ENDS
                END
```

continued on page 209

Save Sanyo continued on page 208

computer. This is because DEBUG uses INT 21 for keyboard and screen, and you're able to run this program from the friend's computer. By the way, programs that don't use this interrupt for the keyboard and screen, such as Sanyo BASIC or WordStar, cannot be run in this manner.

As the DEBUG prompt appears, type D40:107A. As all the Sanyo's screen output is now directed to the second computer, you will see the actual start of the video. For example, if it's 00 00 00 3C, the screen begins at 3C00:0000. to test this, type E 3C00:0, then type FF and ENTER. You've now changed this byte to FF. You should see a large bar appear at the upper left hand corner of your screen. This confirms that 40:107A does indeed contain the video start address.

There are, in all, 3E80 bytes in the Sanyo screen. See illustration 1. If the starting address happens to be 3C00:0000, then the last byte will be at 3C00:3E7F. That's logical, since we begin at 0, and we have to fill 3E80 bytes. However, if the start address is greater than 3C00:17F, then everything changes. Things begin to look confusing. See example 2. Here the screen begins at F00, goes to 3FFF, continues at 0 and ends at D7F. And, say, if the screen begins at 1180, it'll go through 3FFF, continue at 0 and the end of the screen will be at FFF. Any program you write has to take this into consideration.

At long last, the program. Listing 1 contains the source code. It's not necessary that you even look at this Assembly Language program. You could skip over it, and type in the BASIC program. But it sometimes helps if you know what's happening. I won't go into much detail, since the program is commented.

The FCB stands for "file control block." Before we begin to work with a disk file, it's essential that we set our FCB. It contains all the information that the DOS needs to handle our file. For the present, we can disregard most of this. The RECORD SIZE is the number of bytes we write or read on each pass. It's possible to set the RECORD SIZE at 64k bytes. But I've chosen 100H bytes. Why? For a very good reason; Sanyo BASIC only allows us to poke C00H bytes into memory. Therefore, I've created a 100H byte buffer.

The CURRENT RECORD has to be set at zero for a write. If we don't, the file will simply be extended. These are sequential reads and writes. On the sequential read, DOS automatically sets the CURRENT RECORD at zero.

Now, look at Program Listing 2. When you use the BASIC program, you need only load the data into memory once. To save the screen, you use the CALL 0 command. And to load the screen back from disk, you use the command CALL 4AH. I've used drive A: as the disk drive to save on, but you probably will want to change this. It's one for A:, two for B:, and so forth. For the name and extension, I've used A.BBB. You'll probably wish to change this, too. ●

PROGRAM LISTING TWO

```
10 '**** main program code *****
20 FOR A=0 TO &HD2
30 READ B
40 POKE(A),B
50 NEXT
60 '******* drive #, file name and extension *******
70 FOR A=&HE0 TO &HEB
80 READ B:POKE(A),B
90 NEXT
100 '********** error message ***************
110 FOR A=&H205 TO &H20A:READ B:POKE(A),B:NEXT
120 '******** zero a few bytes *************
130 FOR A=&HEC TO &H100:POKE(A),0:NEXT
140 '******** call each time to save and read a file ******
150 CALL &H0  :' &H4A for read
160 '******* data ************
170 DATA  &HE,&H5D,&H83,&HC5,&HE,&HBE,&HDD,&H8D,&H16,&H25,0,&HB4,&H1A
180 DATA  &HCD,&H21,&H8D,&H16,0,0,&HEB,&H77,0,&HC7,6,&HE,0,0,1,&HC6
190 DATA  6,&H20,0,0,&HEB,&HA4,0
200 DATA  &HBB,&HF0,&HA1,&H7C,&H10,&H8E,&HD8,&H8E,&HC5,&HBB
210 DATA  &H3F,0,&H8D
220 DATA  &H3E,&H25,0,&HB9,0,1,&HA4,&HB1,&HE6
230 DATA  &HFF,&H3F,&HE2,&HF9,&H1E,&HEB,&H54,0,&H1F,&H4B
240 DATA  &H75,&HEA,&HE8,&H5B,0,&HCB
250 DATA  &HE,&H5D,&H83,&HC5,&HE,&H8E,&HDD,&H8D,&H16,&H25,0,&HB4,&H1A
260 DATA  &HCD,&H21,&H8D,&H16,0,0,&HE8,&H4C,0,&HC7,6,&HE,0,0,1,&HE8
270 DATA  &H5F,0
280 DATA  &H8B,&HF8,&HA1,&H7C,&H10,&H8E,&HC0,&H8E,&HDD,&H8B,&H3F
290 DATA  0,&HE8,&H3D,0,&H8D,&H36,&H25,0,&HB9,0,1,&HA4,&HB1,&HE7,&HFF,&H3F
300 DATA  &HE2,&HF9,&H4B,&H75,&HEC,&HE8,&H15,0,&HCB,&HB4,&H16,&HCD,&H21,
&HA,&HC0,&H75
310 DATA  &H29,&HC3,&H8E,&HDD,&HB4,&H15
320 DATA  &HCD,&H21,&HA,&HC0,&H75,&H1E,&HC3
330 DATA  &H8E,&H8D,&HB4,&H10,&HCD,&H21,&HA,&HC0,&H75,&H13,&HC3,&HB4,&HF
340 DATA  &HCD,&H21,&HA,&HC0,&H75,&HA,&HC3,&HB4,&H14,&HCD,&H21,&HA,&HC0,
&H75,1,&HC3
350 DATA  &H8D,&H16,&H25,1,&HB4,9,&HCD,&H21,&H5B,&HCB,&H8B,&H40,0,&H8E,
&H8B,&H8E,&H7A
360 DATA  &H10,&H8B,4,&HC3
370 '******** drive #, file name, and extension A.BBB
380 DATA 1,65,32,32,32,32,32,32,32,66,66,66
390 '********* error message ************
400 DATA &H45,&H52,&H52,&H4F,&H52,&H24
```


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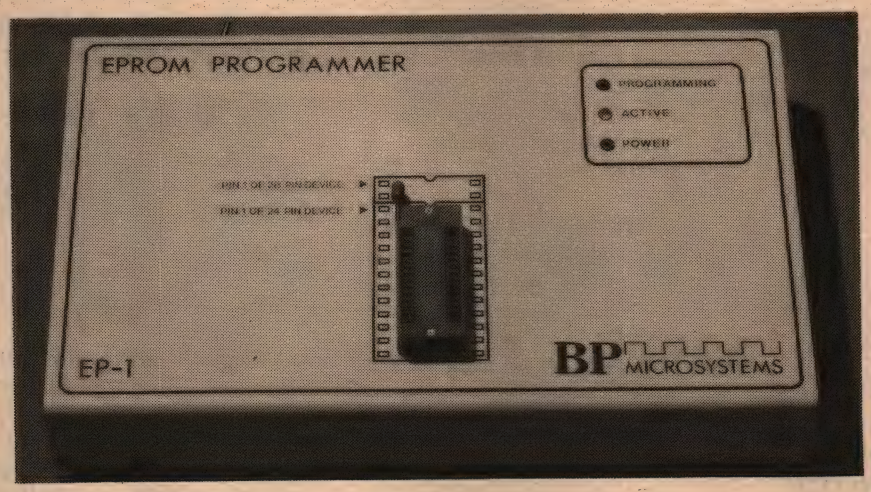

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Generic
2716, 27C16, 2732, 27C32, 2732A, 2764, 27C64, 2764A, 27128, 27C128, 27128A, 27256, 27C256, 27512

Hitachi
HN462716, HN462532, HN462732, HN482732A, HN482764, HN27C64, HN4827128, HN27256

Intel
2758, 2716, 2732, 2732A, 2764, 2764A, 27C64, 27128, 27256, 27512, 2816A, 2817A, 2864

Mitsubishi
M5L2764, M5L27128, M5L27C128

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MK48Z02

Motorola
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Seeq
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IT FIGURES
continued from page 88

latitudes of the starting point and destination, and the shortest longitude difference between them (which is always less than 180 degrees), the program recalculates and displays all values top-to-bottom in a few seconds. This is the typical "What if?" capability so commonly used with spreadsheets. By merely changing any or all variable values from the keyboard, the program calculates the results. Also, any template (with or without values) can be saved to disk for future recall. Templates can even be "chained" to carry variable values and results to other templates.

```
NAVIGATE              NAVIGATOR/BEAM AIMER by Fred Blechman

 1]=PURPOSE: Shortest distance and direction
 2]=between two points on Earth.                    Northern Hemisphere Only!
 3]=
 4]=A is the LATITUDE of the STARTING POINT.        Degrees
 5]=B is the LATITUDE of the DESTINATION.           Degrees
 6]=C is the DIFFERENCE in LONGITUDE between        Degrees
 7]=    Point A and Point B.(Less than 180)         Must be under 180 degrees
 8]=
 9]\+A                                  34.00   Starting Point Latitude
10]\+B                                  22.00   Destination Latitude
11]\+C                                 129.50   Difference in Longitude
12]\+90-A                               56.00   Degrees from North Pole
13]\+90-B                               68.00   Degrees from North Pole
14]\+(COS(L12)*COS(L13))+(SIN             -.28  Calculate cosine of arc
15]\+ARCCOS(L14)                        106.23  Arc Degrees Between Points
16]\+L15*60                           6,373.67  Nautical Miles
17]\+L16*1.1515                       7,339.28  Statute Miles
18]\+(COS(L13)-(L14*COS(L12))              .67  Calculate cosine of angle
19]\+ARCCOS(L18)                         48.17  Degrees from North
20]\+360-L19                            311.83  Opposite Heading
```

Figure 2

```
NAVIGATE   NAVIGATOR/BEAM AIMER by Fred Blechman

 1] =PURPOSE: Shortest distance and direction
 2] =between two points on Earth.
 3] =
 4] =A is the LATITUDE of the STARTING POINT.
 5] =B is the LATITUDE of the DESTINATION.
 6] =C is the DIFFERENCE in LONGITUDE between
 7] =    Point A and Point B.(Less than 180)
 8] =
 9] \+A
10] \+B
11] \+C
12] \+90-A
13] \+90-B
14] \+(COS(L12)*COS(L13))+(SIN(L12)*SIN(L13)*COS(C))
15] \+ARCCOS(L14)
16] \+L15*60
17] \+L16*1.1515
18] \+(COS(L13)-(L14*COS(L12)))/(SIN(L15)*SIN(L12))
19] \+ARCCOS(L18)
20] \+360-L19


      Local Variables

A=34
B=22
C=129.5

      Global Variables
```

Figure 3

Estate Planning

I recently decided it was time to look over my various assets, for estate planning purposes. I needed to determine the current value of various mutual funds, money market funds, stocks, IRAs, bank accounts, savings accounts and CDs. I could have easily done this with a calculator—but then I would have to recalculate values and totals each time I did it in the future. Instead I generated a simple IT FIGURES template (actually, it took two templates, since I had more than twenty assets), and entered the values for each. The printer function allowed me to get a nice, neat printout to show to my legal counselor, and it can be easily updated.

Printer Support

IT FIGURES provides three different printouts to any standard 80-column printer. No special printer driver routines are required. (NOTE: Figure 1 was printed using a special graphic screen-dump program not supplied with IT FIGURES.)

Figure 2 shows the Work Sheet using standard ASCII characters, no graphics. Notice that the right-arrow on lines 14 and 18 is not printed, since it is considered a graphic character.

Figure 3 shows the printout of all the left-screen entries, including all formulas in their entirety. Notice the complete formulas on lines 14 and 18. The values of any "local variables" (used on this screen only) or "global variables" (available on any screen) are also printed. No global variables were used with this template. The global variable file DEMO included on the IT FIGURES disk includes metric conversion formulas. You can generate your own global variable files for special formulas.

Figure 4 is a printout of the comments and results only—a summary without formulas.

Special Sanyo Version

Since the Sanyo MBC 550/555 keyboard is slightly different from an IBM PC, and the hardware uses different printer addressing, SimplSoft provides ITSANYO.EXE on the IT FIGURES disk. This does NOT require the use of the optional "Video Board" used to increase Sanyo/IBM compatibility—it runs on a "plain-vanilla" Sanyo with only a few compromises. For example, I only could get green, cyan and black colors. I chose ITSANYO's color code 120 (black letters on a cyan background) for my main screen, with color code 121 (cyan characters on a black background) for line numbers and key designations. This looked very good on a monochrome monitor as well. Also, some of the Sanyo keys are not marked appropriately ("END" is 2 on the keypad, "HOME" is 1 on the keypad) and the single INS/DEL key needs to be used slightly differently than the IBM separate INS and DEL keys. No big deal. ITSANYO is fast and smooth on the Sanyo.

Vertical Market Editions

In recognition of the specific needs of particular vertical markets, IT FIGURES is being produced in special versions for the Small Business, Real Estate, Banking and Securities/Investment fields.

The Small Business Edition includes 18 templates for everyday business number-crunching and problem solving. IT FIGURES will enable the user to analyze cash flow, do a breakeven analysis, set proper margins, give quotes, balance the cash drawer, figure payroll (including overtime), figure depreciation, produce financial statements (income and balance sheet), analyze a loan, and various other things. Of course, the user can also design and add his own templates.

The Broker/Real Estate Agent Edition does amortization tables, estimated closing costs, buyer qualification, property appraisal and a host of other functions. 18 templates are included.

The Banking Industry Edition includes 24 templates for account margin analysis, IRA projection, Rule of 78, interest, loan balance, installment loans, annuities, customer cash position, rate analysis and many other calculations appropriate to the banking field.

The Investors Edition has 26 templates covering stock analysis, stock growth value, bond yield, return on investment, annualized return, IRA investment analysis, commission, installment loan analysis, interest rate conversions, annuities, Rule of 78, and other calculations.

Pricing

The regular price of IT FIGURES from the manufacturer, SimplSoft, is $39.95 on 5½" disks, and $43.95 on 3½" disks. The Vertical Market Editions are $49.95 and $54.95 respectively.

However, I found IT FIGURES (standard version, 5¼" disk) is sold for $29.95 from The Computer Farm, 11930 Northcliff Road, Elbert, CO 80106; (Phone: 800-822-3949 or 303-495-3815.) They may also offer the Vertical Editions at a discounted price.

Summary

The packaging and documentation of IT FIGURES are first class, and the power of this program is enormous, yet it is relatively simple to learn and use. Like any powerful program, it will take some time for you to realize and use all the many built-in features (most of which I haven't had room to discuss in this brief review). The main concepts and operation will only take you a half-hour or so, and you'll be off and "figuring."

While IT FIGURES is not designed to replace Lotus 1-2-3, Framework, Symphony, CalcStar, SuperCalc or the host of other integrated or spreadsheet packages for POWER users or sophisticated applications, it has sufficient power and versatility for many complex tasks, and is a lot easier to learn and use.

```
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Degrees
Degrees
Must be under 180 degrees

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Degrees from North Pole                  68.00
Calculate cosine of arc                   -.28
Arc Degrees Between Points              106.23
Nautical Miles                        6,373.67
Statute Miles                         7,339.28
Calculate cosine of angle                  .67
Degrees from North                       48.17
Opposite Heading                        311.83
```

Figure 4

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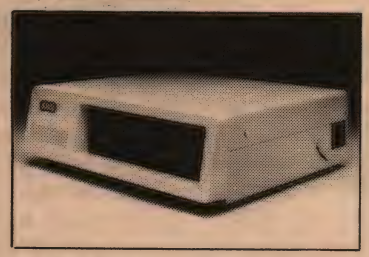

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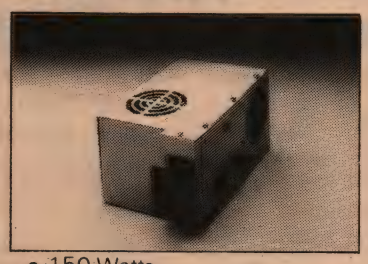

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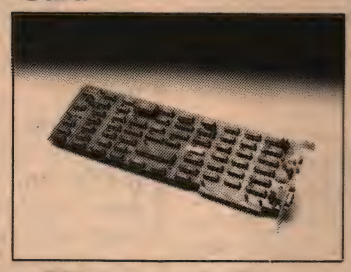

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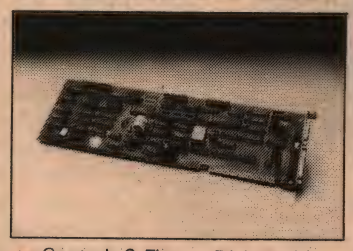

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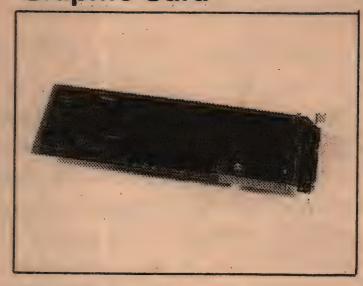

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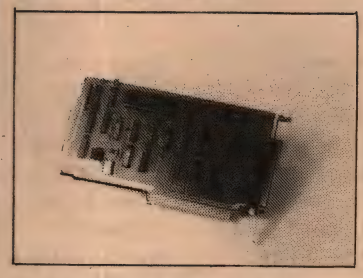

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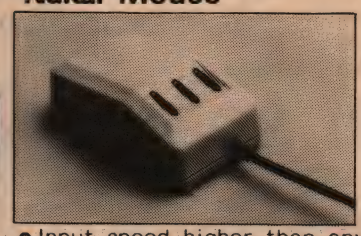

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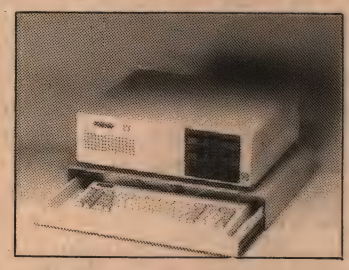

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The Silver Box continued from page 210

produces two types of 68B45/HD46505 with different set of codes).

Then it goes into sequence of reading the very first sector in Drive "A" and loads the contents into the RAM starting at 0038H:0000H.

The ROM sequence directs CPU to reset the Disk Controller first and then goes out to initialize the 8255A, the Printer Port. When the CPU comes back from the job, the Disk Controller may or may not have completed the software reset operation. It checks for the BUSY BIT and keeps checking it until it goes off. (This is where the CPU is trapped in an endless loop as found later.)

It then HOMES the drive. If you are rebooting the computer, you might hear a buzzing sound of moving head at this point. It checks for BUSY BIT again and when the BUSY BIT goes off it checks for NOT READY BIT this time. NOT READY BIT will be "ON" if: 1) you did not put the diskette, 2) the disk is not turning or 3) you forgot to close the lever. If NOT READY BIT is found, it loops back to HOME operation. If NOT READY BIT is clear, it sets up the CPU registers to start reading.

When the loading is complete, the final sequence in the ROM tells CPU to jump to the beginning of the code just loaded. You can seeing all these codes if you disassemble the codes in ROM starting at FE00H:
1E00H using DEBUG's "U" command [UFE00:1E00].

Well, my Silver Box does not HOME the head even though I deliberately set the head in the middle by hand while the power is off. Do not force the head while the power is on. You might ruin the head or disrupt the alignment!

I spent some time with scope trying to find some unusual or missing signals or waveforms. After long hours spent looking into the scope, I was finally convinced that there is nothing wrong with the signal lines. (This was a premature conclusion, as I found out the next day.) Then, I noticed something. When I poked a certain section of the board near the Disk Controller, the head homed. This happened twice.

Looking at the board, I noticed something unusual. Some of the through holes were filled with solder. Not all of them, just some of them. About 10% of these same through holes had solder in it! They looked like a hand job, otherwise, all the holes should have solder in them. I have been accustomed to see all the holes filled with solder in all the computer boards I have come across, but not this Sanyo board! Then I remembered I had to hand wire an open trace on one of the Color Boards.

Sanyo must have a good reason to fill some holes, and I set out to fill the remaining empty holes. I pulled out the Main Board and laid it on the desk and started to solder the holes with my best pencil iron I bought when I visited Tokyo the last time. It is light weight and conveniently slim with very sharp point. The only bad feature of this "SURE SX-20" is that the tip has tendency of becoming loose in a short time. The clip between the heater-shaft and the tip loses spring tension because of high temperatures. I made several notches and dimples on the clip and wedged it hard in between the heater section and the tip.

I filled a few hundred holes near the Disk Controller, the 74LS05 TTL buffer and holes around the Drive Interface Connector. This operation cured one intermittent problem, that is, a successful homing of the head, but, the motor in the drive did not run, constituting the NOT READY condition and CPU just loops there endlessly! This suggests I might have one more open trace or something of the sort.

In desperation, I started to check all the signals on all the Address Bus and the Data Bus. After a few minutes I found a suspect. The D0 line was conspicuous. It was low, from the start of the loop the CPU is in and to the end of the loop. All other data lines showed some highs at several OP CODE steps in this software loop. In order to synchronize my trigger scope I hooked into the IORD* signal at the Disk Controller.

The I/O READ takes place only once in the loop the CPU is trapped. This means, if I trigger my scope with this signal my scope can lock on the loop and the scope can show you the status of any one of the BUS lines at each OP CODE step. If you take time to analyze each line, you can see every single bit, high or low, taking place in the BUS at each CPU step.

I turned off the power and checked the suspect line with the multi-meter at RX10 range. My multi-meter puts out more than 150 milli-amperes at RX1 range and might burn some inputs of NMOS or CMOS ICs. Sure enough, it showed low resistance value, about 20 ohms, a very low value. I checked similar lines, such as D1, D2 etc. They showed high impedance, more than 10K ohms. The D0 line is definitely abnormal. Checking the schematic I found ten ICs and the A9 pin of the expansion pins were connected to this line.

I cut the connecting lines at some convenient places checking the impedance (resistance) every time. If a semiconductor junction is connected to the line I am checking, the impedance would be different if I swap the test probe. If the impedance is pure resistance, like when the transistor junctions in an IC were melted and fused, the reversing probes (polarity) would not produce different readings on the meter. Eventually I found six suspects, three 74LS245s and three 74LS373s. I cut the suspect pins one by one and narrowed the suspects to two.

Both suspects were type 74LS373s. One had No.2 output pin almost shorted to the ground. It showed resistance of about 30 ohms. The other had bad No.16 pin, another output pin, also shorted to the ground with about 70 ohms resistance. This condition produced 0 volt signal level on D0 DATA Line, any time all the time.

After removing and replacing the two ICs, I tried to determine what had happened and concluded that I had committed another silly act of misplacing the board, rather than misplacing the connector pins. I remembered that the computer blinked when I pulled the backwall attached to the Main Board. I also vaguely remembered that one side of the Main Board was not on the step located on the chassis wall, but under it. This condition did not destroy these two ICs directly. The chassis was floating. Unless the backwall is in contact with a part of the chassis, the contact between the Main Board components and the chassis is not a direct short. The contact may have had a flinching effect on the program execution, but, it did not damage the ICs at the first contact.

The D0 LINE is wired to the pin 2 of the DRAM IC located near the left front Rubber Foot retaining screw. The pin 2 had a misfortune of touching the screw. My conjecture is that a point in the +5V line has also touched the chassis a the same time and shorted to the chassis with a little spark producing a transient just powerful enough to knockout the two ICs.

I cut the two ICs out and put the replacements in place, the repair had been done. I was in the full hopes that the computer should work perfectly this time. The power switch was turned on with a bagful of anticipation, but the result was the same. The CPU is still looping in an endless loop. I went to bed frustrated. The best thing I could do now is to cut all the pins of the 1793 Disk Controller and install a socket in its place so that I can try new 1793s. If you tried to save the chip with help of vacuum pump, it may take long time to get it out and you may damage a few holes. But, I wanted to test this chip just to satisfy my curiosity in finding what went wrong on it. Curiosity can kill many people, including me. The job is now listed in the DO-LIST with high priority.

In next month's column, I would like to report on the PIGGY BACK method of expansion using 256K DRAMs, together with some of the long promised topics such as Farrow-Mod, photos and more about the V20 as possible. If your requirement is just 640K of expanded memory, you should be able to do it without any piggies using a small add-on board and the existing sockets to receive sixteen 256K DRAM chips. I wrote to Dick Stone of Northeast Instruments in April discussing what would be required to achieve this and he succeeded in implementing it according to his recent letter. He is developing the add-on board which can be used to implement up to 736K with the VB550, color board, or maximum 960K without the color board. The test result of his add-on board will appear in this column when a reasonable test is done. ●

Expanding H/Z continued from page 86

same benchmark runs on the 5Mhz Blue Thunder in 43 seconds or almost a 33% improvement.

Compared to the software Z-80 emulators, there's an even greater difference. For example, Gtek's CPEmulator ran the Sieve in 9 minutes and 15 seconds. Blue Thunder is almost 1300% faster!

Blue Thunder usually either keeps up with, or outperforms the popular 4 and 5Mhz Z-80 CP/M systems (like Kaypro, Osborne, and the H/Z-89/90). The high speed processor and faster PC-bus are hard to beat. By the way, if speed is absolutely critical, you can always get the 9Mhz Blue Lightning!

Some Minor Limitations

I do have a few minor complaints about Blue Thunder. It would be nice if more than just the Kaypro terminal and disk formats was supported. Most emulators are now including multiple terminal and floppy disk formats as part of their software support. In my conversations with the Decmation staff, they have mentioned that they are considering adding these capabilities to the Blue Thunder package.

Another problem, for me, was the lack of in depth technical information provided in the user's manual. While the manual did a good job of explaining the installation and use of the board, it didn't elaborate very much on low level programming of the board or the actual hardware interface. No schematic or block diagram of the board is included, either. For certain uses of the board, that information is essential. Perhaps Decmation will make the information available on request to registered owners, but it's not in the manual.

Summary of Blue Thunder

Blue Thunder is a well made product, and set a new price point for Z-80 coprocessor boards. Added to a PC compatible, it can produce an 8/16 bit machine which runs both MS-DOS and Z-80 CP/M, for less money than a Z-80 machine, alone, would have cost just a year or two ago. Such is progress in the world of microcomputers.

The CP/M emulator program is one of the best I've reviewed. It easily handled software which crashed without warning on other emulators. The ability to provide instant and full access to the MS-DOS environment is also available.

Overall, Blue Thunder represents a new breakthrough in low-cost CP/M capability for the PC. I feel this package is the best value for the money, I've seen so far. For more information, contact Decmation (address and phone at end of article).

(Late note: Micro Interface Corp. has just released a new version of their RUN/CPM emulation software that's compatible with this board. A review of this software is found later in this article.)

Turbo Boards Revisited: Breaking the 4.77Mhz Speed Limit

Last month, we looked at the theory behind many of the inexpensive CPU speed up boards/modules that are coming on the market (also known as turbo boards). These boards typically accelerate the normal 4.77Mhz CPU clock to 6.00, 6.67, or 7.37Mhz. The result is a 30% - 60% improvement in overall system thoughput. As I described last month, most turbo boards are designed in one of two ways, which I call the brute force and dual clock approaches.

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The brute force-type boards increase the overall system timing including the CPU peripheral chips clock. Because most PC compatibles weren't designed to run any faster than 4.77-Mhz, they often don't work reliably with this type of board.

The newer dual clock boards have solved some of these problems, because they tend to put a little less stress on the CPU support chips. The dual clock boards also keep the real time clock accurate. The dual clock approach is part of the solution to speeding up the CPU, but not all of it.

The internal support chips of a computer also have to be capable of handling the higher clock rates on a sustained basis. As I've mentioned before, it's quite a task to trace down the support chips and replace those which are slow. Fortunately, there is a new speed module, especially designed for the H/Z-150, which has addressed this problem. (It works with most other PC compatibles, too.)

TurboPlus: Finally... A Turbo Board That Flies!

The new TurboPlus board is a dual clock board (like Exec-PC's PC-Sprint, reviewed last month). It also has a hardware reset button and can switch from high to low speeds at any time while the computer is operating. Because it includes high speed replacement for some of the slow support chips found in many H/Z-150s, TurboPlus is much more likely to run at 7.37Mhz (it did in my reluctant machine).

TurboPlus, has an additional plus for H/Z-50 users: it boots at higher speeds. When running other dual clock boards on an H/Z-150, you have to boot at 4.77Mhz and then switch up to full speed. This is a slight idiosyncracy of the H/Z-150's power-on diagnostics. (Most other PC compatibles can boot without problems at the higher speeds.)

TurboPlus, has solved this problem complete, while being fully compatibility with other systems. Runing TurboPlus at 7.37 Mhz, and booting from a hard disk, the reboot times for my H/Z-150 are now under fifteen seconds, including diagnostics!

Hardware and Installation

Like other turbo boards, TurboPlus is a small circuit board, which plugs into the H/Z-150's CPU card or a PC compatible's motherboard. To install the new board, you remove the 8284 CPU clock generator chip from the original CPU card, install it on the TurboPlus board, and plug it all back into the 8284 socket. The circuit board has been designed to fit into the tight space between the Z-150's cards, so it's easy to re-install the CPU card with TurboPlus.

Attached to the board, by a length of ribbon cable, is a small black box enclosure containing a speed selector toggle switch, LED indicator, and hardware reset button. The black box can be mounted anywhere you wish on the back, top, or front of the system case (adhesive strips provided). Although it may not be as aesthetically pleasing, it's easier to get to than a switch in one of the back filler panels.

Faster Chips Do the Trick

Included with the TurboPlus board, are three faster replacements for the slow IC chips on the CPU board. This includes an 8Mhz V-20 CPU, a ceramic 8237A-5 DMA controller, and a new 8288 bus controller. The replacement chips have been burned-in and individually verified to work as 7.4Mhz.

Dante Bencivengo, TurboPlus designer, says his research shows that many, if not most, H/Z-150s were shipped with plastic AMD 9517A-5 DMA chips, instead of ceramic Intel 8237A-5 versions. Although the 9517A is listed as exact replacement for the Intel part (at 5-Mhz), these plastic chips are very poor in handling the higher speeds of turbo boards.

Dante also states that the NEC version of the 8288 bus controller (also used in many H/Z-150s) often fails at higher speeds. In fact, he has to hand test batches of 8288s in order to find ones that can handle 7.37 Mhz. Coincidently (?), Zenith uses a custom PAL chip to replace 8288 in the H/Z-158 and 148 models. (Perhaps they've also had trouble getting 8288s that could handle 8Mhz!)

Fast Support Chips Available Separately

If you've had trouble speeding up your machine you probably need to relace one or more of the chips mentioned above. In addition to complete TurboPlus modules, Dante is also supplying the fast CPU, DMA, and bus controller chips individually. This means if you have already bought a turbo module and it won't run in your machine, you may be able to get it working by obtaining the proper chips.

If you aren't sure which ones may be bad, I suggest replacing all three of them. After replacing the chips in my machine, not only did TurboPlus run at the full 7.37Mhz, so did PC-Sprint, and the brute force Time Works module (at 6.66Mhz).

In addition to upgrading the CPU and support chips, you may also have to replace some slow RAM chips, to run at 7.37Mhz. While most H/Z-150s are using 150 ns. or better RAM chips, some may still be using 200 ns. or slower. TurboPlus just happened to run fine in my machine which has a mixture of 200 and 150 ns. chips, but don't count on it working for you! If you are using the olde 200 ns. chips, you might consider upgrading them all to 150 or, better yet, 120 ns. chips.

TurboPlus's Performance

I've been running benchmarks on several speed modules, including TurboPlus and I intend to have a more complete report on these benchmarks in a future column. From the benchmarks, it's clear that modules like TurboPlus do make a measurable, and noticable, improvement in CPU speed.

Overall, the benchmark programs demonstrate an improvement in average computing speed of about 30%, average, at 7.37Mhz. Operations that involve a lot of disk and screen I/O, are improved about 20-30%. Operations which are more CPU-oriented (like spreadsheet re-calcs and other number crunching), can sometimes demonstrate a 30-60% improvement.

Of course, the longer an operation takes, the more dramatic the improvement. For example, if a spreadsheet re-calculation takes 10 seconds at 4.77Mhz, but only takes 6 seconds at 7.37Mhz, after a while the 4 seconds saved may not seem like much. But, if a database sort takes 30 minutes at normal speeds, and is only 20 minutes long at 7.37Mhz, it's a little easier to justify the purchase of a speed module. This is an obvious point, but one that needs to be emphasized before spending money just to make spreadsheet re-calcs a few seconds faster.

Summary

I found TurboPlus to be easy to install, reliable in operations, and well supported. Dante Bencivengo is to be congratulated and thanked for devoting his time and energies to finding and solving the speed problems in the H/Z-150. If you're having trouble with other modules, try this one. It looks like a winner. For more information, contact Dante Bencivengo (address at end of article).

Micro Interface Corp.'s New RUN/CPM Emulator

Back in February, I reviewed an early Beta-test version of RUN/CPM from Micro Interface Corp. (MIC). Though the Beta version had some weak points in its pre-release form, I saw a potentially powerful emulator package. I've just received the latest version of RUN/CPM and it's certainly living up to expectations. The current release has been greatly improved, with many new features added.

First of all, the CP/M emulation code has been significantly cleaned up and certain problems in the Beta version have been fixed. For example, the early version often rejected parameters using the wildcard (*) character. That's now been corrected. This version ran most of the 8080 code I tested without any major problems. The CCP emulator still allows you to directly run all MS-DOS commands while in the CP/M mode (the only other emulators I've seen with this capability are Blue Thunder and Z80MU).

RUN/CPM also now includes a menu-driven, customization facility for configuring a wide range of emulation parameters. Over 35 different terminal types are now emulated. A new disk device driver (called READ/CPM) is included that lets you read, write, and copy to almost 100 different CP/M disk formats. You can also redirect CP/M I/O to logical devices, set up MS-DOS subdirectories as CP/M disks, run CP/M programs in color, and toggle a 25th status line display on and off.

One new feature that I especially like was the ability to toggle the floppy drives, from MS-DOS to CP/M configurations, from the command prompt. If you deal with a lot of data disks in different CP/M formats, this is a handy feature.

Now Compatible with Decmation's Blue Thunder!

Micro Interfaces has just announced that they are going to produce a version of RUN/-CPM that's compatible with Decmation's Blue Thunder and Blue Lightning boards. They are going to package the new software and the Z-80 board together under the name RUN/CPM Plus. For more information contact Micro Interfaces Corp. (address and phone at end of article).

(My initial impressions of the differences between RUN/CPM Plus and the Blue Thunder packages are based on very limited testing at this point. From what I've seen, I'd say if you are interested running as close as possible to 100% Kaypro emulation, you may find the Decmation software package is more accurate. But, if you are interested in emulating a wider variety of terminals and reading more disk formats, then the RUN/CPM version may be more to your liking).

Adding 80 Track Drives To Your H/Z-150

For those of you who have been considering adding one of

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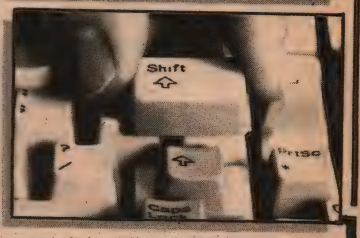

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TI Forum
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let's not confuse ourselves at this point.) We are "GOSUBing" to the function "menu()". We close our main() function with a closed brace and we are finished with our first function in this short program.

We next start a new function, called "menu()". We do not end the naming of a new function with a semicolon. We then use another open brace to signify to the compiler the start of this function's code. The next line is an important one. It is the declaration of a variable, "C". C, unlike BASIC, requires that you declare ALL variables within a function at the START of the function. (Again, for the sake of simplicity, I will not discuss the difference between local and global variables). WE are declaring an "integer" ("int") variable, called "C." We are telling the program, "we will refer to something called "C" in this function and it will be an integer." Next, we clear the screen again with putchar(12), and set up another screen display with a series of 6 pairs of "locate" and "puts" functions. Again, a series of "DISPLAY AT's".

The next statement sets out previously declared variable "C" equal to another "getchar". Unlike our first getchar(), this time, we care what key is pressed as it determines which menu was selected. With this statement, we equate "C" to the ASC value of the keyboard item pressed. We are, in effect, saying TWO things: `INPUT X C=ASC(X)`

The next statement is simply to test if the keyboard press for getchar() was something between 1 (ASC 49) and 4 (ASC 52). If it was less than ASC 49 or greater than ASC 52, we call menu() again. In essence, we are saying, in BASIC,

```
100 INPUT X
110 IF (X<1) OR IF (X>4) THEN 100 ELSE 120
120 (the next statement)
```

The "!" (not a colon but FCTN A) is a "bitwise inclusive OR". If either or both the operands are TRUE, then the "THEN" operand is executed. "IF the ASC value of C is less than 49 OR the ASC value of C is greater than 52, THEN ask again; ELSE do the next statement." If either of the statements are true, do "menu()" again. If both are false (i.e. C is between 49 and 52), keep going.

The next two statements clear our screen again with putchar(12), and place our cursor at row 1, column 1 with "locate(1,1)". Then, we take our integer variable C and set it equal to C-48. What does that do? If C had the ASC value of 49 ("1" was pressed), C-48 would give us C = 1. If C equaled 52 (4 was pressed), C-48 would be 4. This statement is nothing more than saying, in BASIC: `C=CHR$(C)`

Then we use a new function, "printf". Like puts(), printf() allows us to print a string. But it is different in that it also allows us to print a decimal integer variable also as part of the string. Look at the printf statement. The "%d" in the statement tells the compiler that we are going to print a decimal integer variable (thus, the reason for the "d"; we would have used "%C" to print a character variable). The entire statement is enclosed in quotes, then a comma, then the integer variable we want placed in the screen display where the "%d" is. In this case, the integer variable "C". Since we didn't know before hand, which key would be pressed for the menu selection, we had to use a variable. And to print a variable, we have to use printf() instead of puts(). If we were clairvoyant and knew that menu selection 1 would be chose, we could have used puts ("Your choice was 1 from the menu"); but we didn't so we use the variable C and printf(). Next, we move the cursor to row 24, column 1, print "Press any key to continue.." and then wait for a keypress with getchar(). Again, this time we don't care which key is pressed for getchar(). Then, we call our first function "main()" and set things up all over again. We close the function "menu()" with a closed brace to signify the end of the function "menu()".

We then save this to disk. Run the compiler for an output file and assemble the output. When we load our program, we have a slight twist. First we load our assembler output with E/A option 3, then we load CSUP as always. But, instead of entering nothing when we get our "File Name:" prompt for the third time, we have to load a third file. When you get the filename prompt again after loading CSUP, load in the D/F80 file "PRINTF" from your C99 program disk. Since we REFerenced it in our program, we HAVE to load it before the program will run. When PRINTF is loaded, hit enter the fourth time you get the "FILE NAME:" prompt from E/A 3, then enter "START" for the "Program Name;" prompt and our menu example should run.

There you have it. Your first C99 "program" (such as it is). If you want more on C99, write us at *Computer Shopper*. As always, we will include some programming tips with your reply if you enclose an SASE. And we will reply to every letter with an SASE.

Quick Product Note: I have just received a copy of Joy Paint 99 (Great Lakes Software, 804 E. Grand River Ave., Howell, MI 48843; $49.95). While I plan a full review soon I have to tell you now that I think it is the very best graphics program for the TI I have ever seen. Absolutely. Buy it. More on that later. Corcomp (2211-G Winston Road, Anaheim, CA 92806; (714) 956-4450) continues its support of the TI with two new product announcements. They have a "99Home Sentry" system which is the software to run the popular X-10 Powerhouse to computerize your home. Lights, cooling/heating, and appliances can be programmed to run off the X-10. The software and hardware has a SRP of $79.95 and you'll need a separate module (running $13.95) for each electrical appliance you want to control. This system is available for many other computers and now we are in that mainstream as well. The second product from Corcomp is a memory expansion device. You can get a stand-along model (not requiring Expansion Box) in a 256K version ($249.95) or 512K ($269.96) or a card for the expansion box (256K for $169.95; 512K for $229.95). They also hint at some new software to utilize these devices to their maximum potential. Write or call Corcomp for details. While it is difficult to print in this column schematics for hardware modifications, we hope to make some available by mail soon. If you have made any changes that you would like to share with others, or if you are interested in doing soldering to improve your system, send your schematics or needs to us at the *Computer Shopper*. We know there are schematics available for adding 32K memory directly to the console, building an auto-answer/auto-dial device to a cheap Volksmodem, building an 8K "super cartridge," and others and we hope to be able to mail those out soon. You have to write to let us know your needs. Speaking of schematics, one of the best sources of that kind of information comes in the form of a newsletter from Bruce Caron out of Canada. It is full of technical information of the highest quality. The *R/D Computing Newsletter* is monthly and excellent. It is not new having been in publication for over a year and the back issues are worth getting. You can subscribe for $14/year and that includes 12 issues and first class postage. Write to Ryte Data, 210 Mountain Street, Haliburton, Ontario, Canada KOM 1S0. Thanks to the Mid-South Users Group (P.O. Box 38522, Germantown, Tennessee 38183-0522) for the great newsletter. What an active group. We'd like to see more users group newsletters as they are a major source of developments for the 99/4A home computer. We're also interested in giving a little ink to any Fairware programs users write, so send us the details and we'll try to publish them.

So much new software has been written for the TI-99/4A recently, all of which is public domain! Here's an overview of some of the latest developments for our not-so-small computer.

TI-RLE — "Run Length Encoded" graphics have rapidly become the industry standard for high resolution graphics. Two programs have recently been written that will allow the TI-99/4A to convert an RLE file on disk to a picture that can be displayed on the screen or printed on the printer. Paul Gray has written 99RLE, a public domain Forth program that will do such a translation of RLE files, and Travis Watford has written an assembly language program for the same purpose.

Where can RLE files be found? Well, bulletin boards and major telecommunications networks are a good starting place to look. CompuServe, a major computer network (we'll be delving more into telecommunications in later articles), has quite a few RLE pictures available, from mugshots of the FBI's Ten Most Wanted to pictures of famous celebrities. Although many of these pictures are copyrighted, many are not, which means that they will soon be finding their way to bulletin boards and user group libraries as soon as Paul and Travis' translation programs do!

This is really a major advancement for the TI-99/4A, not to mention an impressive enhancement. Figure 1 is an RLE picture of W.C. Fields, downloaded from CompuServe's TI Forum, which demonstrates the resolution of RLE graphcis. Paul Charlton, author of the "fairware" FAST-TERM terminal emula tor, says that plans for adding RLE protocol to his program are in the works. Adding RLE display abilities to a terminal emulator means that RLE pictures could be displayed and printed as they are received from a network or BBS, eliminating the need to receive what looks like junk and then translate it with one of the translator programs. "It's number six on my list," says Paul, "after writing a new operating system and taking care of a few other tasks." A promise was extracted from Paul to release a new version of FAST-TERM as soon as possible.

Other programs include a program being developed by Coe Case to actually copy IBM-format disks (MS-DOS or PC-DOS) to TI format with a TI computer. Coe has successfully taken a document created with Wordstar on a PC and transferred it to a TI-99/4A with his program. More work needs to be done, as Coe needed to create a directory and bit map on sector 0 of the new TI-format disk, as well as a file header on sector 1. There is certainly a lot of potential here, though, allowing those 99/4A users with PCs of some sort at work or elsewhere to set up some kind of meaningful dialog between the computers. We will keep you updated on progress with this program!

Yet another interesting enhancement for the TI-99/4A has been the discovery by Howie Rosenberg of "DCOPY," a public domain disk copier that not only will work with the Myarc 128 or 512K RAMdisk card, but will also ARCHIVE a group of files in a directory. The idea behind archiving files is to take any number of separate files and place them all under one filename, seemingly as one DISPLAY/FIXED 128 file. Using DCOPY, the one file can then be ungrouped again into its original parts.

This is especially convenient for transferring files to a BBVS or other telecommunications network, since only one file need be downloaded instead of several, eliminating the possibility of missing a necessary file in a series. The archiving process adds two sectors to the combined length of all the files, so there is no actual compression of the data. The ability to compress files (making them unusable until uncompressed, but smaller until then) would mean that less time would be necessary for transferring files to telecommunications networks, meaning a savings in money for pay services and allowing more users to access a BBS in a given time, since less time would be needed for each user to send or receive a file.

Although we do not have compression ability yet, the archiving feature of DCOPY should be very useful. DCOPY, like RLE, should be making its way to local bulletin boards and TI users groups very soon.

It is incredible to see such continuing interest in and development for the TI-99/4A. These new programs are a reminder that our computer is far from dead or abandoned; we are doing just fine. ●

Expanding H/Z
continued from page 213

the many 80 track 5¼" drives to your system, here's a letter received from one of our readers, David Hart, on how to do it:

"The following is a description of how I set up my own system: I already had an 80 track drive laying around and I wanted to hook it up to my new HZ-150. I asked around and no one knew how. Then I found out about Datadisk software. They have created MS-DOS device drivers for 80 track disk drives, so I got a copy for my machine.

"Eagerly, I installed my ½ height drive into my HZ-77 cabinet, and then connected it (running the cable through a slot in the back of the computer case) to the second pin header on the disk controller card in my HZ-150. I then had to pull the CPU card and change the switches for the amount of drives connected to the system, and fool with the jumpers on the drives to get MS-DOS to figure out what the third drive was. (The jumpers on the Mitsubishi had to be set to drive 0 and HM.) Within an hour, I had my first 80 track disk formatted and ready to use.

"Using Datadisk, there are four different 80 track formats and two 40 track formats. The 80 track densities yield 813K, 808K, 731K, and 649K. The 40 track densities yield 403K and 362K. Each of these formats use from 10 to 8 sectors per track. The different formats vary in their efficiency of file storage and retrieval. I found that the 10 sector disks, 40 and 80, while providing more storage capacity, copied and loaded programs much more slowly than other formats. The 9 sector format, both 40 and 80, performed very close to standard MS-DOS disk (which are 9 sectors per track).

"There are a few drawbacks to Datadisk software, but Small Office Systems are promising that their next version will overcome them, For example, you can't read 40 track disks in the 80 track drive. You also can't boot from the 80 track drive or non-standard 40 track formats. They are also promising 8 inch and 1.2 Meg. drive support in their next version. Another item to note is that the Datadisk program disk is copy protected and so is their format program disk. The disk I received didn't have a write protect tab on it, and it needs one.

"The Datadisk software runs $44.95 ea. (or 3 for $67.50). You can order it from Small Office Systems (address at end of article). If you need help or more information on this, you can contact me at the address below."

David Hart
Rt. 1, Box 327B
St. David, AZ 85630

Thanks, David, for all the good information! For those who are interested, I'm planning a future column on adding other floppy formats, like 8 inch, 5¼ inch, and the new 3½ inch drives. If you can't wait, I suggest that you contact Floppy Disk Services. They have already successfully installed all of these formats in H/Z-150s. They also carry the Datadisk software driver mentioned above, a wide variety of floppy drives, and have good technical support and service. You can call them at (800) 223-0306.

Keep Writing In Folks!

Feel free to write me, c/o the *Computer Shopper*, with your comments, questions, and observations on this column. If you're in a big rush, you can also contact me, by mail, at:

Drude Micro Services
P.O. Box 533
Cedar Falls, IA 50613

A couple of comments on writing in: First, unless you include a SASE (self-addressed stamped envelope), I cannot give you a reply in writing, but your letter will still be considered for publication. Second, all letters automatically become property of me (and the *Computer Shopper)* and are subject to reasonable editing (for length and clarity).

Reader Disk Still Available

Yes (in case you are wondering), as a service to our readers, I'm still providing MS/PC-DOS 2.00 formatted disks that have a tutorial on the NEC "V" chips, a CPU timer benchmark program, and two Public Domain/Shareware CP/M emulators for $5.00 postpaid. Send your request to the above address. Please make your check or money order payable to "Ted Drude" and write "Attn: Zenith Disk Offer" on the envelope.

In a future column, I also plan on reviewing more CPU speed up options, and some of the benchmark programs often used to test them. When it was said that "figures don't lie, but liars figure," I'm sure the author didn't know about computer benchmarks or he would have included them in the quote, too!

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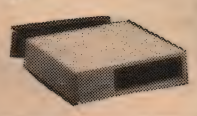

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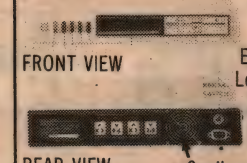

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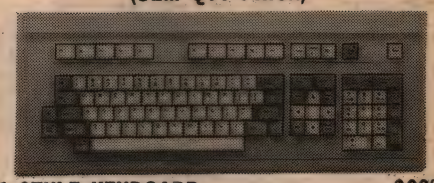

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Ask the Guru
continued from page 73

an 8-bit word. This is called Packed BCD. If you are using packed BCD, you must first unpack the bytes before ASCII conversion, and then later repack them after being converted from ASCII.

To unpack a low BCD byte, logically AND it with hex $0F. To unpack a high BCD byte, shift or rotate the word to the right four times, and then AND it with hex $0F.

To pack a BCD word, shift the high BCD byte to the left four times and then OR it with the low BCD byte.

Some extra additions might be needed for your software if you want to right justify the number or suppress leading zeros. Zero suppression is done by replacing a $30 zero with a $20 space.

The 6502 microprocessor has a special decimal mode that works directly in packed BCD. Other micros usually have ways of faking something similar. These days, though, you usually do *not* pack the BCD decades.

0	0000 -	0011 0000	$30
1	0001 -	0011 0001	$31
2	0010 -	0011 0010	$32
3	0011 -	0011 0011	$33
4	0100 -	0011 0100	$34
5	0101 -	0011 0101	$35
6	0110 -	0011 0110	$36
7	0111 -	0011 0111	$37
8	1000 -	0011 1000	$38
9	1001 -	0011 1001	$39
A	1010 -	0100 0001	$41
B	1011 -	0100 0010	$42
C	1100 -	0100 0011	$43
D	1101 -	0100 0100	$44
E	1110 -	0100 0101	$45
F	1111 -	0100 0110	$46

Fig. 3 - Hexadecimal and ASCII equivalents.

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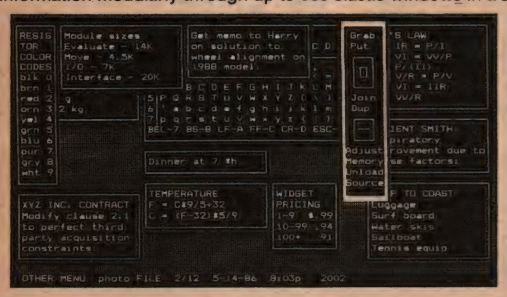

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How Can I Convert Hexadecimal To ASCII?

Things get a tad more complicated when you try to convert between hexadecimal and ASCII.

You might want to do this when you are displaying a "hex dump" of a computer's monitor program on a screen. Some stand-alone EPROM burners also require their hex bytes be passed back and forth as ASCII characters, as does the bit image information on laser printer halftones.

There are both advantages and penalties to converting hex to ASCII before sending it somewhere. The biggest advantage is that everything is sent as ordinary numbers or letters. There is thus no possibility of confusing, say a hex $0C for a formfeed, or a hex $0D for a carriage return.

Illegal characters cannot be sent since there aren't any. As a further bonus, an ordinary word processor can also be used to process hex characters in ASCII form.

The penalties of hex to SCII conversion involve both speed and storage size. You'll need *two* printable characters to show a single 8-bit hex word pair. Thus, it will take you *twice* as long to send converted bytes over a serial interface than it would to send straight hex.

It also takes twice the space to store hex values in ASCII form. Which gets particularly nasty when laser printing video or photographs.

To review, a four-bit byte can be shown in hexadecimal. There are sixteen possible 4-bit states. The first ten states 0000 through 1001 are shown as decimal digits, exactly as is done with BCD. The final six states are often shown as uppercase letters, with $1010 = A, $1011 = B, on up through $1111 = F.

Figure three shows us how to do these conversions. To get from hex to ASCII, add decimal 48 or hex $30 if the number is *nine or less.* If the number is *ten or more,* add decimal 54 or hex $36.

To get from ASCII to hex, you first have to test to find out if you are converting a valid letter or a numeral.

Such *range checking* is always a good idea anyway. If you have a numeral (CHR$ 48-58 or hex $30-39), then subtract decimal 48 or hex $30. If you have a letter (CHR$ 65-69 or hex $41-46), subtract decimal 54 or hex $36 instead.

The actual conversion details depend on your programming style and the microprocessor and language in use. In the *Apple IIe* monitor, there are several built-in machine language routines for hex to ASCII and ASCII to hex conversion.

Specifically, $FDE3 will convert the low hex accumulator byte to ASCII. $FDDA will convert the entire accumulator to a hex ASCII pair. $F941 will print first the X register and then the accumulator as four successive hex digits.

Finally, $FFA7 will reverse the process and convert the ASCII characters in $003E (low) and $003F (high) into a two-byte hexadecimal value.

You can tear apart this code for a quick study on conversion details. The innermost secrets of easily and rapidly tearing apart machine language code appear in my *Enhancing your Apple II,* volume I (SAMS #21822).

Tell Me About All Toner Cartridges

The Canon laser engines, such as the LaserWriter or LaserJet use a plug-in cartridge that includes toner, the photosensitive drum, corona charging, and just about everything major that is likely to need servicing in a xerographic copy machine.

These cartridges cost from $65 to $100 each and are only good for 2500 copies.

Worse yet, there are definite quality control problems, and not every cartridge is usable over its whole life. Every once in a while, a cartridge flat out refuses to give decent blacks, particularly over larger areas.

What can be done to lower cartridge costs and improve the output quality?

First, note that you can NOT and must NOT use an ordinary copier toner cartridge or ordinary copier toner. Besides mechanical interlocks that prevent you from doing this, copiers use a *positive acting* toner (light = white), while laser printers use a *negative acting* tone (light = black).

Second, the box means exactly what it says on that 104 degree Farenheit max temperature warning. Should cartridges lay around in a hot warehouse or a sunny truck, their quality will rapidly deteriorate. So, be sure to cool it with your cartridges.

Third, be sure to often do routine maintenance. The corona wire inside the toner cartridge must be wiped every so often with the little green wiper tool. The corona wire inside the laser printer needs cleaning every now and then with a Q-tip. Be very careful to not stress the wire when you do this.

It's also a good idea to keep a solder sucker or childs rectal syringe on hand. Every time you open the machine up for whatever reason, be sure to dust things off thoroughly.

Fourth, keep the fusion wiper pad clean. It pays to lightly scrape it with a knife every 500 copies or so. And be sure to change it when you change the cartridge.

Fifth, rock the cartridge every now and then to redistribute the toner.

Sixth, do not fight the drum's life cycle. Fresh cartridges are usually somewhat too badly washed out for the first few hundred copies. In fact, most drums do not get up to their best blackness until

continued on page 217

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Ask the Guru continued from page 216

several thousand copies *after* they first run out of toner!

So, always keep two or more cartridges on hand. Run the first one until it starts putting out solid blacks. Then immediately switch to the second one for all rough copies, internal memos, and anything else that does not need a super-black output.

Use the old cartridge for quality work and the new one for anything non-critical.

Seventh, choose your paper carefully. Some papers give excellent results, some marginal, and some unusable.

For everyday use, the plain old xerox paper from your local price club at $1.80 a ream should work OK. For the blackest black on the whitest white, the best paper I have found so far is Classic Crest Avon Brilliant White. This is made by Neenah Paper and is available through most paper distributors. We get ours from Ingram Paper.

Eighth, you can repair cartridges. About one in six or so will fail from some other way than running out of toner. It may be permanently gray, may have bad shading, or may have a scratch, a ghost, or a dropout. If this happens, you can move the toner from the sick cartridge over to a good one that ran out of toner.

And finally, yes you can easily reload cartridges yourself. A cartridge can be reloaded three to five times at a cost of $20 per reload or less. One supply source is Laser Printer Products, but dozens of others are showing up. I've found their toner to be somewhat blacker and denser, but also somewhat less crease and scrape resistant than the original.

Present pricing is $20 for one toner reload, and $1.50 for a new wiper pad. They will also buy old cartridges outright for $10 each.

I have yet to discover the original source for bulk toner. Let me know if you find it.

How Can I Reload A Toner Cartridge?

Few people realize that there is a snap-on, snap-off filling plug in the toner cartridge. The reason they don't realize this is that it takes a special screwdriver, some epoxy carving, spring popping, pin removing, getting fingerprints and light on the drum, and enough other hassles that this cap is simply not worth accessing.

Why, it is almost enough to give you the impression that Canon might not be totally in favor of 1/5 cost reloads.

Reloading is fairly simple, though, if you forget about the plug.

Remove the large cardboard label, popping it off from the middle with a dull knife. Scrape a 5/8 inch square hole in the top end of the inside toner tank, using a plexiglass cutting tool. Pour the toner into the tank using a plastic funnel, shaking gently as you go along. Then tape the hole shut.

Please send me your toner tips and horror stories so they can be passed on. And be sure to return defective cartridges so the quality control people at Canon can clean up their act.

And, should you have any opinions on a design that purposely goes out of its way to make a refillable cartridge unrefillable, you might mention this to them one way or another as well.

How Can I Get Filthy Rich This Month?

Naturally, you use my Applewriter/Laserwriter Utilities, and, of all things, Applewriter on a IIe and the LaserWriter.

Surprise, surprise.

The scam this month is—window decals!

You can easily create professional, full color window decals that show store hours, giant letters, etc. through a window or glass door. You can do so in a few minutes at a tiny fraction of the price a sign shop would charge. Being on the inside, the decals are pretty much immune to vandalism.

Figure four shows a typical decal as printed, while Figure five shows us the way it appears when viewed through the glass.

Figure 4

Figure 5

The key secret lies in the Laserwriter's ability to print backwards. To do reverse printing, just issue a -1 1 SCALE 612 0 TRANSLATE command. You then print on transparent, self-stick acetate.

Now for the sneaky full color gimmick. Say you want the HOURS to be red and the rest of the decal blue. Mask all but the HOURS and spray it with red paint from the hobby store. They spray everything blue. Next, add a second protective acetate overlay. Finally, apply the decal to the inside of the window by peeling and sticking.

When viewed through the glass, you will see frontwards reading black 8-6 and DAILY on a blue background, a black border, and red HOURS lettering.

All quickly and at an utterly negligible cost, compared to traditional sign shop methods. And in virtually unlimited color combinations.

You can also create vinyl letters, and most any commercial sign-most any way you like. It should also be possible to get toner to interact with Scotchcal photosensitive vinyl, but this is one exciting area I simply haven't gotten around to yet.

One hint: If the chosen material will not accept toner well, then print backwards on the backing strip instead, and cut things to size with scissors.

Most any large paper distributor can get you bulk materials, but the best source I've found for small or experimental quantities of self-stick acetate, mylar, vinyl, or fluorescent bumper sticker material is Dick Blick. They have several catalogs. The one you want is the sign making and screen printing one.

Call or write, and I'll be happy to lay some free window decal samples on you. Plus, of course, the usual free laser demo pack, and a framable picture of Meowwrrr from last month's column.

By the way, Meowwrrr has now been traded to the Tigers. You simply will not believe his new uniform. ●

NAMES & NUMBERS

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Box 1267
Galesburg, IL 61401
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(602) 428-4073

Modems for the Apple continued from page 74

pensive, and the faster a modem is, the more expensive it is. Ironically the 2400 baud modems have not caught on as well as expected. Many users and time sharing services are waiting for the next generation of more sophisticated even faster modems expected. Besides baud rate, the most important cost factor is the brand name. If the three magic letters "IBM" (or "AT&T") are on your modem, it will be MUCH more expensive. D.C. Hayes and Apple Computer are also more expensive nameplates for modems.

Besides baud rate and brand name, different modems have different bells, whistles, and beeps. Various features include: real time clock, clock with a display, an extra modular jack to attach a phone, compatible with multiline phone systems, large memory buffer, built-in help menus, automatic redial for busy signals, etc. The newest, and most powerful modems have special listening circuits. With a Smartmodem you can instruct the modem to wait a couple of seconds (e.g. when waiting for a second dial tone), but Prometheus and Novation modems can listen for second dial tones. With some modems you can even tell the modem to ignore a "call waiting" click instead of hanging up. All of these features make modems easier to use, and you'll have to decide which ones you need.

Here are the key questions to ask when purchasing a modem:

A) What baud rates are available?
B) Can it automatically pick up the phone?
C) Is it (Hayes) Smartmodem compatible?
D) Really?
E) Are you sure it is fully Hayes compatible, or is it just partially compatible?
F) What extra commands and features are available?
G) Which of those extra features come with the modem, and which are extra cost options?
H) Will this modem work with all of my programs?

Modems for the Apple II Series

DC Hayes introduced the Hayes Micromodem II for the Apple II in 1979. The single board modem electrically "glued" together a communications card and modem. The card included the 6850 ACIA (Asynchronus Communications Interface Adapter) used by the Apple Commuications card with a more sophisticated terminal program in ROM, and an external adapter called "Microcoupler" which attached the main board directly to the phone line. The Micromodem had many features not possible in acoustic modems. Since it was attached directly to the phone line a much better audio connection was possible. The modem would automatically connect to the phone line, dial the phone number, and indicate connection to the remote computer. Since the Micromodem can detect phone line rings it could automatically pickup the phone line and connect to another system, without local assistance. These features are all considered fairly standard now, but were considered major enhancements in

continued on page 218

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Franklin Ace Under $500

Franklin Computer Corporation introduced the new FRANKLIN ACE 500, a powerful yet extremely affordable Apple-compatible computer designed for today's computer user. The portable ACE 500, utilizing the 65SC02 microprocessor, runs software written for all models in the Apple II family. The new ACE runs most of the newest Macintosh-like mouse-based Apple II software as well as older educational titles including the Davidson series. Scheduled for delivery in August 1986, the ACE 500 will carry a suggested retail price of $499.

The FRANKLIN ACE 500 delivers more high performance features while offering a greater degree of rugged reliability and hi-tech styling than any other personal computer in its class. Standard features include:

* 256K RAM Memory, expandable to 512K—fully RAM-power needed to run the new desktop programs
* One 5¼" floppy disk drive, including a built-in disk controller, with 164K storage capacity—that's 15% more storage than standard Apple drives
* Parallel printer port—designed to run the widest range of printers
* Serial port
* Mouse/Joystick Port
* Disk drive port (for Unidisk or any other Apple II compatible disk drive)
* Graphics screen dump utility which supports Okidata, Works compatible—all the Epson, C. Itoh and Star Micronics printers
* Dual character sets, allows user selection of either the standard (classic) character set or Mouse Text
* Switchable 40/80 column display

A unique feature of the ACE 500 is its built-in RGB color as well as Apple-compatible composite color graphics port, fully compatible with both Apple and IBM RGB monitors. By adjusting a front panel slide control the user can select between our RGB text colors, BLUE, GREEN, AMBER or WHITE, when working with a word processing or spreadsheet package.

One of the most impressive features of the ACE 500 is its 90 key, full-travel keyboard that includes: 12 user-progammable function keys, a numeric keypad with built-in BASIC editing key functions, cursor keys, "Open F" and "Closed F" keys, and break and reset keys. The 12 programmable function keys are preset with the 12 most commonly used FRANKLIN DOS 2 commands.

The ACE 500 front panel is equipped with 8 LEDs (Light Emitting Diodes) to indicate: the degree of CPU activity; double-high resolution mode; selection of either Apple or IBM color palette; disk drive activity; when the drive is writing to the disk; CAPS lock and NUM lock activity; and power on/off. A volume control is located on the front panel and an external 3.5mm earphone jack is installed on the side of the CPU.

The light-weight external 30 watt power supply used by the ACE 500 is so compact it's wall-mountable, unlike most external power supplies which are bulky and occupy valuable work space.

Franklin instituted a "no-nonsense" warranty policy with the introduction of the ACE 2000 Series last fall and will continue this very popular program for the ACE 500. Should any problems arise during the 90 day warranty period because of defects in materials or workmanship, dealers are authorized simply to exchange the end user's machine over-the-counter for a new one.

For more information contact Franklin Computer, Route 73, Haddonfield Road, Pennsauken, New Jersey 08110; (609) 488-0666.

Mention that you read about it in *Computer Shopper*. ●

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Modems for the Apple continued from page 217

1978 when the Micromodem II came out. Best of all the Micromodem was less expensive than a Communications card and an external modem purchased separately.

The Micromodem does have several disadvantages though. The modem can only pulse dial, it has no Touch Tone capability. When the language came out it turned out that the Micromodem firmware was incompatible with it and extra programs would be needed to make it work with Pascal. The Micromodem can detect a carrier signal, and will "tell" the host program that it has one, and it can tell the user there is a carrier by lighting a LED, but it cannot tell whether or not there is a busy signal or anything else on the phone line.

Still, the Micromodem was inexpensive, and well supported by many different programs ranging from terminal programs and Bulletin board programs to remote control dialing utilities.

If you want to use your Micromodem with a long distance network (e.g. MCI, Allnet, etc.) or with a PBX system which only supports Touch Tone, then you'll have to dial the number manually. Dial the computer you want to connect to by hand, and tell your terminal program to tell the Micromodem to dial the phone number "1". After you get a carrier, hang up the phone you used to dial. Your Micromodem should still be attached, and you can proceed normally.

In 1983 Hayes came out with a new deluxe version, the Micromodem IIe. Contrary to what the name implies, the Micromodem IIe will work just as well with an older Apple II. The main external difference is the lack of the external microcoupler box. All of the electronics are on one board, plus a new feature, software controllable speaker. The speaker can be turned on so the user can listen and tell whether or not the line is busy. The Micromodem IIe also has the capability to touch tone dial, under a user program. Unfortunatly, to make sure that the Micromodem IIe is 100% compatible with the Micromodem II, the firmware was not updated. It still is not Pascal compatible, will not Touch tone dial directly, and the speaker cannot be accessed from the built-in firmware.

The Micromodem series is quite popular. Popular enough so there are several "compatible" modems on the market. Most of those compatibles are 90% copies of the hardware. but do not have the built in firmware. A program which accesses the ACIA registers directly will work with these compatibles, but if a program requires the firmware, it probably won't work. Many of these modems also lack other Micromodem features. Some do not have the capability to answer the phone, others use manual switches to access the various modes, and others do not have any carrier indicator.

When purchasing a modem for the Apple two terms are very carelessly used. "Micromodem compatible," implies that the modem will work with programs designed for use with the Micromodem II. "Smartmodem compatible," imples that the modem uses the "AT" commands used by the Smartmodem series. The two types of modems are totally incompatible, and require different setups, and different programs. Purchasing one instead of the other will not give you what you want, or need. So what does "Hayes compatible" mean?

In 1981 Novation decided to come out with a direct connect modem for the Apple. They introduced their "Apple Cat modem." To quote the ASCII Express Pro manual: "The Apple CAT is probably the most sophisticated modem AE PRO is compatible with and is responsible for many new features previously unattainable in terminal software." Those features include compatibility with the deaf network, touch tone dialing, accurate dialtone detection in call cycles, a handset for use as a phone, an aux RS-232 port, and even a BSR X-10 port.

The Apple Cat modem really is the most powerful I/O port available for any microcomputer. Since it is attached directly to the Apple's bus, the Apple can easily control all of the Cat's functions. Besides using my Apple Cat as a modem, I've also used it as an answering machine, a remote home controller, an auto dialer, and a speaker phone. My most powerful Apple Cat application was to use it to help a handicapped friend. She speaks commands into the Apple, and the Apple Cat dials the phone for her. You can even put seven(!) Apple Cats into one Apple IIe, attache them to seven phone lines and operate an electronic party line. With the proper software, the Apple Cat can emulate any exotic phone ever made.

There is only one disadvantage to the Apple Cat. 99% of all Apple programs which support modems support the Micromodem. 90% of the programs support a serial card with an external modem. 89% of the programs support a serial card with a Smartmodem compatible modem. About 60% of the programs support the Apple Cat. Since the Apple Cat is a more sophisticated unusual modem, many software companies decide that it is not worth it to support it. This decision is made by the marketing people, not by the technical people. On the other hand there are hundreds of programs available which will only work with the Apple Cat, and will not work with any other modems. As with any hardware purchase, make sure that the software you want to use will work with the software you are interested in purchasing. Since the Apple Cat can be controlled directly, and is software controlled, it is the most versatile modem designed for microcomputers. I wouldn't give up my Apple Cat for anything!

If you want a more compatible 1200 baud internal modem for the Apple, that is also available, In 1984 Prometheus decided to produce a direct connect 1200 baud modem for the Apple. Since the Smartmodem commands are very popular, Promethus decided to make the Promodem 1200A a Hayes compatible modem. Since it plugs into an Apple, it emulates an Apple Super Serial Card from the Apple's point of view.

Two modes are available on the 1200A. In the standard operating mode the 1200A looks like a Super Serial card and will operate with any program designed to work with a Super Serial card and external modem. In the alternate mode the firmware includes an intelligent terminal program. The program supports downloads and uploads in DOS 3.3, printer functions, and various housekeeping functions. If you need to quickly access another computer, you can just use the built in program by typing "PR#2" instead of booting a diskette. In either mode terminal programs which address the modem directly will work.

Overall the Promodem 1200A is slightly more powerful, takes less desktop space, doesn't need an extra power supply, and is less expensive than an external modem. The only major disadvantage is that the external Promodem 1200M is somewhat more expandable, and can be expanded with external accessories including a LED display, real time clock with battery backup, and buffer.

As everybody "knows," the major "feature" (documented bug) of the Apple IIc is that it will not work properly with a

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Modems for the Apple continued from page 218

1200 baud modem. Well, "everybody" is wrong. It's true that early Apple IIcs would have problems at 1200 baud with certain modems, but it's also true that all new Apple IIcs have the problem corrected, and a free upgrade is available for users who have older IIc's.

To understand why the problem existed in the first place, you have to understand the design of the original Apple II (1977 model!) When Steve Wozniak designed the Apple II he combined many functions to save chips. The same circuit that controls the video display also refreshes the dynamic RAM, and controls the Apple's timing. All of the Apple's timing is controlled by a 14.318 Mhz crystal. A divide-by-four circuit changes that timing into the 3.58 Mhz frequency needed by the color video circuitry, another division circuit produces the 1.023 Mhz frequency used by the Apple's 6502 processor, and a 7.159 Mhz signal is also provided. Instead of needing four separate timing circuits, the Apple only needs one! On the original Apple IIc the 14 Mhz signal is put through a 74LS161 chip setup as a division circuit to produce a 1.79 Mhz timing signal which is used by the IIc's serial ports (remember this, we'll come back to this point later).

When the Apple III came out in 1979, Apple decided to use the 6511 ACIA. The 6551 was designed for use with the 6502, and more functions were available than with the 6850 used in the earlier Apple II Communications card. In 1981 Apple stopped producing the two early serial cards for the Apple II (Communications and High Speed Serial) and introduced the Super Serial Card. In order to give Apple II owners the serial capabilities in the Apple III, and to ensure compatibility between the Apple II family and Apple IIIs, the 6551 was used. (Ironically, it took another two years before the Serial III card came out to give Apple III owners the capability to add a second serial port.) The Apple Super Serial Card's 6551 is controlled by an onboard 1.8432 Mhz timing crystal. The Apple IIc's serial ports emulate the Super Serial card, but the IIc uses the 74LS161's division timing circuit instead of a crystal.

Here we see the problem. The Apple Super Serial Card uses a 1.8432 Mhz crystal (which is what Synergistics, the manufactuer of the 6551, specifies), but the Apple IIc uses a 1.79 Mhz circuit. The timing on the original Apple IIc's serial port is off by about 2%. Two percent is well within the EIA's RS-232 specifications, but certain modems and communications programs are not as tolerant, and will not operate properly.

Apple Computer has always acknowledged that such a problem did exist, and was already working on a solution by the time the consumers were receiving the first Apple IIcs. The Apple IIc's schematic diagrams (pg 272-276 *Apple IIc Reference* Manual vol. 1 — Apple p/n 030-0814-A) state "ON SHEET 4 OF 5, LOCATION B4, Y1 IS A FUTURE OPTIONAL PART." Y1 is a 1.8432 Mhz crystal which replaces the 74LS161 division counter. All Apple IIcs with serial numbers greater than D510001 have the "1200 baud fix" (as it is known) installed. If you have an earlier IIc, then your Authorized Appler Dealer will replace the motherboard, at no charge as long as you can prove that you have purchased ANY (included non-Apple products) serial device.

Since the IIc emulates the Apple Super Serial Card, most terminal programs designed to work with the Super Serial card will work with the IIC without any modifications. Some programs include a special driver for the IIc, but if you see a terminal program which you like which is setup for a Super Serial Card, then try it; it will probably work.

If you want to just access a system quickly, without using a terminal program, then Diagram #1 shows you how to use the IIc's built in terminal program. The IIc's ROMs include a terminal program, similar to the (you guessed it!) Super Serial card's terminal program. All of the IIc's terminal program commands are full documented in the *IIc Reference Manual* (Volume 1, Chapter 8.)

The IIc's serial ports use DIN 5 connectors to simplify connections (Even a screwdriver isn't needed—a user just has to push in a connector), but most modems use DB-25 connectors. In an earlier *Computer Shopper* article ("RS-232 cables for the Apple IIc and Macintosh" February '86) I gave directions on how to wire your own modem cable for the IIc.

ASCII Express Pro

AE Pro is one of the most powerful terminal programs available for the Apple II computers. AE Pro supports every serial card, and every available modem for the entire Apple II series (Apple II, IIe, and IIc), and even the Apple III's emulator mode. AE Pro's special functions include: automatic dialing features, macros, a built in editor, unattended answer, online help, and full interrupt support. Uploads and Downloads can be in either text or ASCII format. The Macros are powerful enough so you can instruct AE Pro to dial a system until it gets through, log on to your account, read your mail, save the mail to your diskette, and tell you if there are any messages. After setting up, and saving the macro to your AE Pro diskette, all you have to do is put your AE Pro diskette into your drive, and turn on your computer. AE Pro will automatically do the rest itself. The AE Pro program is extremely powerful, but it is also extremely complicated. This is the only disadvantage. The 339 page manual will teach a novice user how to use the simplest AE Pro functions, and give a general description of the more powerful functions. Even if you don't know anything about modems, or computers, you will be able to use most of the features of AE Pro. However to use all of the features, you'll have to do a lot of work on your own. It would be very nice if somebody came out with an AE Pro tutorial diskette and manual (not so subtle hint).

AE Pro is available in either DOS 3.3 or ProDOS format. The ProDOS update includes a twelve page addendum to the manual. Unfortunately the ProDOS version is written only as an update to the DOS 3.3 version. It will support all of the ProDOS pathnames, but it will not support ProDOS interrupts, since it uses its own interrupt system.

A free AE Pro demo diskette is available from United Software Industries. Just write or call and ask for the "AE Pro demo diskette". Tell 'em *Computer Shopper* sent you.

Companies mentioned:
Prometheus
4545 Cushing Pkwy.
Fremont, CA 94538
415/490-2370

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Manzanita Releases BusinessWorks Payroll

Manzanita Software Systems of Roseville, Calif., released the BusinessWorks Payroll System , completing the BusinessWorks accounting series.

BusinessWorks Payroll is a comprehensive payroll system designed for medium-to small-sized businesses with fewer than 1,000 employees. In addition to producing payroll checks and necessary government reports such as W-2 forms, 940 and 941 reports, BusinessWorks Payroll provides comprehensive payroll analysis reports, including employee lists, time card entry reports, payroll register, period activity reports, compensation history, and a summary "flash" report that provides a concise overview of important payroll information.

The system maintains complete employee information for up to 500 employees on a removable media disk or 1,000 employees on a hard disk, including hire and review dates, wage and tax information, and vacation, holiday and sick pay hours worked. It automatically calculates and prints payroll checks, and allows recording of handwritten checks, useful for "after-the-fact" payroll. Check detail can be maintained for the entire quarter, and checks can be voided at any time.

As with all other BusinessWorks modules, BusinessWorks Payroll converts information to AppleWorks data base and spreadsheet files for further study. In fact, BusinessWorks looks and acts like AppleWorks, using the same screens and key strokes, so there is no need to learn two sets of instructions.

Among the many features of BusinessWorks Payroll are the ability to prepare payroll for hourly, salaried, commission or piece rate employees on a weekly, biweekly, monthly or semimonthly basis. It can even handle tips, advances, and reimbursement of employee expenses. The Payroll System allows up to 25 user-defined deductions in addition to standard tax deductions, 25 commission rates, 200 job codes for accurate job costing, and 100 standard rates. It tracks payroll liabilities and tells you when it's time to make a payroll tax deposit. BusinessWorks Payroll provides tax tables for all 50 states, Washington D.C. and the federal government that can be modified as needed, and tracks employees in up to four states.

BusinessWorks Payroll can be integrated with the other BusinessWorks modules to form a complete accounting system, or it can be used as a stand-alone system. Other modules include General Ledger, Accounts Payable, Accounts Receivable, Inventory Control and the System Manager (the only required module).

BusinessWorks Payroll runs on the Apple IIe or IIc equipped with two UniDisk 3.5 drives, one UniDisk 3.5 drive and a RAM card, or a 3½" or 5¼" floppy disk drive and a ProDOS-compatible hard disk. Its suggested retail price is $455.

For more information contact Manzanita Software Systems, One SierraGate Plaza, Suite 200-A, Roseville, CA 95678; (916) 781-3880.

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The Apple CP/M Column
Doin' The Ol' Disk Shuffle

by Jesse D. Sheinwald

Most Apple-CP/M users are acutely aware of the problem of having enough disk storage space. As mentioned in an earlier column, the 126K of formatted disk II storage for CP/M has been described by another author as "pitiful." Maybe pitiful, but clearly not useless as evidenced by the large number of Apple-CP/M systems around. The two big questions are: 1) What can you do (and not do) with 126K of disk storage? 2) If it truly is a problem, what can be done about it?

First things first. As a minimum an Apple-CP/M system should have 252K of on-line disk storage. That is two disk II's worth. I seriously doubt if you can do serious work in CP/M with only one disk drive. It is theoretically possible, I just do not think that you can live that way. If you are contemplating trying Apple-CP/M and you have one disk drive, invest in a second disk drive first.

Typically, a CP/M set-up with two floppy disk drives would operate in the following manner: Drive A would have the CP/M boot-up program, some system utilities and the applications programs. Drive B would have the data files that the applications programs would work on. The problem with this little scenario lies in Drive A. With only 126K of formatted storage, it is often impossible for that one disk to hold all of the necessary programs. For the programmer there is usually plenty of room for programming tools like compilers and assemblers to co-exist on one Apple disk with the operating system. For the major applications user however, there is just not enough room on a 126K disk for a major applications program (such as Wordstar), and all of the necessary system routines.

Users of major applications programs then get involved in a little dance called "The Ol' Disk Shuffle," and it goes like this: First you put your boot disk in Drive A and turn on the system. Then you put your file disk in Drive B. After the booting process is complete, you remove the boot disk in A and replace it with your applications program disk (for this example let's use my favorite word processor NewWord). Then you type in NW (or for WordStar WS, or whatever the .COM file for your application is). Then that program loads up. Then you change the logged in drive to B, for that is where your stored programs are. Then you are all set to work.

Actually it is more complicated to explain than it is to do, and after going through the procedure a few times it gets to be automatic. However, it always takes time and it always requires several diskhandlings. So, when you finally get tired of "The Ol' Disk Shuffle," what are you to do?

First choice may be a hard disk. Good possibilities, however this is an entire subject unto itself and it is going to be saved for a future discussion. Just let's say for now that all is not rosy with present day hard disk systems and that system compatibility is a very thorny question.

The second choice is a high-density floppy, and here is where new possibilities abound.

One of the most interesting—and universal—of these is the Equidisk + from H & M Disk Drive Services. The Equidisk + consists of two high density (over 700K each), half-height floppies in an enclosure with internal power supply, switchable power outlets for external devices and an interface card for the Apple. (For an excellent, detailed review of the Equidisk + see Equidisk + High Capacity Drive for Apple CP/M by Philip Chien, *Computer Shopper*, June 1986.)

To use the Equidisk + you need as a minimum one Disk II type drive, and the Equidisk + controller card must go at least one slot below the Disk II controller card. The Disk II is needed to boot-up the system, and its controller must be kept in a slot above the Equidisk + 's slot. In the bootstrapping ROM in the Apple there is a program that looks to boot from the lowest numbered drive in the highest numbered slot, and besides the ROM does not know how to boot from a disk in the Equidisk + format.

If you had an Equidisk +, how would you work with it? The first thing would be to keep in mind the proper CP/M disk drive designations for it. In a minimal configuration, with one Disk II type drive and the dual disk Equidisk +, the Disk II will be drive A and the drives of the Equidisk + would be C and D. Drive B would be the second drive that works off of a standard Disk II controller card, whether it exists or not. The Equidisk + also comes in a single drive version that upon installation would become drive C.

When you turn on your system, the bootstrapping program goes into action and looks for a bootable disk in drive 1 slot 6 (or wherever the lowest numbered drive in the highest numbered slot is). The Equidisk + also works with DOS 3.3 and ProDOS as well as CP/M, and to use those systems the appropriate bootable disk must be placed in the boot drive. When booting is complete (in CP/M), the A prompt will appear. At this point you are all set, you can continue to work from A, or you can transfer control to the Equidisk + C drive with the C: command. Such a system in word processing for example, would be to boot up on A, transfer control to C, load up word processing disk on C, and

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Modems for the Apple
continued from page 219

Hayes Microcomputer Products Inc.
PO Box 105203
Atlanta, GA 30348
404/441-1617)

Novation Inc.
20409 Prairie St.
Chatsworth, CA 91311
818/996-5060

United Software Industries
8399 Topange Canyon Blvd.
Canoga Pk., CA 91304
818/887-5800

Diagram -1: Accessing the IIc's serial ports

Enter Applesoft BASIC (the] prompt), and type the following: (indicates that the character should be typed in as a CTRL character e.g. A means type CTRL and A at the same time.)

]PR#3 This turns on the 80 column mode. Leave it out if you want to use 40 column mode.

]IN#2 The serial port "looks like" a card in slot 2.

] AT Ctrl-A T enters the terminal mode.

— At this point the prompt changes into an underscore, and you are in the terminal mode.

A6B Sets the baud rate to 300 baud. (For 1200 baud type A12B)

At this point you should type in the commands which instruct your phone to dial the computer you want to log on to, or, if you are using an accoustic modem, you should pickup the phone and dial. For example, if you are using a modem which uses the "AT" commands (e.g. Hayes Smartmodem, or compatible), then the following command will pick up the phone, set touch tone mode, and dial Telenet through its 800 number:

AT D T 1-800-424-9494 (spaces for clarity, not needed)

The modem will print "CONNECT" when it obtains a carrier, or "NO CARRIER" if it doesn't find a carrier. While in the terminal mode be careful not to hit CTRL-U, or the forward arrow. CTRL-U will turn off the 80 column firmware, and put you into the 40 column mode. To exit the terminal mode type Ctrl-A Q. The IIc's firmware corrects one major "bug" in the Super Serial Card. The SSC would occasionally lose characters at 1200 baud, but the IIc stores characters in the auxiliary memory $800 page instead of losing them. If you use the IIc's firmware, be aware that any data from $800-$900 of the auxiliary memory will be destroyed. Under rare circumstances at 1200 baud, and under most circumstances at higher baud rates, you will lose characters at the beginning of each line when the screen scrolls. To prevent this from happening, type "POKE 34,2" after the PR# command. The poke will change the IIc's window from 24 to 22 lines. Since less display has to be scrolled, no characters will be lost. ●

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The Apple CP/M Column continued from page 220

on D. With the high density disk format your word processor can have a dictionary and utilities all on the same disk, and you could have room for plenty of large manuscripts. Goodbye Ol' Disk Shuffle!

H & M has incorporated a very interesting feature into the Equidisk+ that is worthy of special mention: the ability to read other than Apple-CP/M formatted disks. They supply the software so that drive C can be configured to read disk in the Televideo fomat. Granted, Televideo did not exactly set the world on fire with its CP/M machines, but the advantage is that Televideo-CP/M is in a more "standard" format than Apple-CP/M and many commercial suppliers of CP/M software—if they do not stock it—can convert software into the Televideo format more easily than the Apple format.

It seems to me that it would have been more advantageous for the Equidisk+ to be able to read a more common CP/M format, such as Kaypro or Osborne, being that those machines are very popular. A spokesman for H & M says that this change is a very real possibility in the future.

At the present time, the Equidisk+ cannot work with all Apple-CP/M cards. Check with H & M to see if yours is among those that work. For cards that are not among the ones on their list, H & M claims that they will imminently have the proper software drivers. Judging from my telephone conversations with them, it appears that they are using the "squeaky wheel" method of development. The cards that they get the most requests for get oiled in the form of proper software.

One more detail to keep in mind is to use the proper floppies with the Equidisk+. The drives are high-density and H & M recommends that you use Double-Sided-Quad-Density (DSQD) disks in them. These disks are often referred to, in disk ads, as "96 TPI" (tracks per inch) disks. You may have to buy them by mail, for few local dealers tend to stock them.

Another possible way to increase your on-line floppy disk storage is with Apple's new Unidisks 3.5. This drive uses the small 3.5 inch floppy's in the rigid plastic case just like the ones used on the Macintosh. Being that IBM has elected to use this form of floppy in their new laptop machine would seem to indicate that this may be the floppy format of the future.

Just like everything else in Apple-CP/M, the use of the Unidisk 3.5 is neither simple or obvious. First, if you read the news releases on the Unidisk 3.5, you will find that it is only intended to work with ProDOS. This fact has yielded a small industry of entrepreneurs publishing software that will enable the Unidisk 3.5 to format and read DOS 3.3 disks. DOS 3.3 is easy because for all Apples it is the same. For CP/M the old problem of the multiplicity of Apple-CP/M cards gets in the way.

To use any disk system requires a BIOS (basic input/output system) to be written for that systems hardware. Since all CP/M cards are a little bit different, they all have BIOS's that are different. The fact that the Unidisks 3.5 is intended for ProDOS only just makes the job more difficult. One company that has approached this

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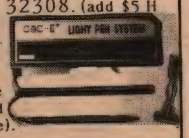

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The Apple CP/M Column continued from page 221

problem with a unique solution is Advanced Logic Systems for their CP/M card. (Note: this is their CP/M Card, the one that runs CP/M 3.0, not the card that is called the Z-Engine and runs CP/M 2.2.)

What they have done essentially is to write a ProDOS "shell" around CP/M. In other words, your system reads ProDOS, writes ProDOS and "sees" ProDOS, but it will really be working on CP/M. The most impressive thing about this is that the ProDOS is transparent to the operator; it all looks and feels like CP/M to him.

They have marketed, for about a year, a similar system for hard disk use only, and there had been some reported bugs with that system. This new system is supposed to have these bugs worked out plus allow the use of—in addition to hard disks—the Unidisk 3.5 and extended memory cards of the main bus variety (not slot 0 cards). According to ALS, you need a CP/M card of at least revision level B to use this software. This software should be available by the time you read this.

Operationally, the use of the Unidisk 3.5 would be very similar to the use of the Equidisk+. That is, you will not be able to boot CP/M off of the Unidisk 3.5, and the Unidisk(s) 3.5 controller must be in a slot lower than your Disk II controller. When the system is set up, the Unidisk(s) 3.5 will become drives C, D, etc.

ALS had never marketed the hybrid ProDOS-CP/M system for hard disks too aggressively, so if you want information on this system for the Unidisk 3.5, you may have to push them pretty hard to get it.

Problems, Problems

Almost from the beginning of the Apple II line, when people discovered you could plug in all kinds of wonderful accessories into the slots, the first CP/M cards made their appearance. Just like most third party hardware and software, the CP/M cards were neither approved or dissaproved by Apple. It was just another feature that made the computer move valuable and a better buy. The fact that you could run CP/M on your Apple was occasionally mentioned in an Apple ad, and CP/M does get a slight mention in the Apple II manuals. While it is acknowledged that it exists, there is no such thing as an officially sanctioned form or version of CP/M for the Apple.

This is both good news and bad news. The good news is that the computer owner has the option of what type and complexity of hardware he would like to use in his machine. The bad news is that each CP/M card manufacturer does things a little bit differently than each other manufacturer so that a problem that exists with one card is not a problem with another card. This means is that few global solutions exist for CP/M problems on the Apple.

There are scores of different kinds of cards that can plug into the Apple bus. Most of the time, everything works fine and everyone is happy. Sometimes, however, cards can interract with each other in unpredictable ways. If you are working in one of the Apple's "native" operating systems there are debugging techniques to help find problems. If you are running CP/M on your Apple, troubles are harder to find. A technique that works on manufacturer X's CP/M card interracting with manufacturer Y's parallel interface card, may not work when the user changes over to manufacturer Z's parallel interface. A sad fact of Apple CP/M life is that due to vast multiplicity of different card arrangements possible, it is conceivable for someone to have a nearly unique problem. In this case there may not be any solution available from any printed reference, user group, or even the hardware manufacturers involved. The idea here is to get some of these "unique" tough problems out in the open and see if maybe—just maybe—someone somewhere has solved it or has a solution to it. Send those "unsolvable" problems to the address at the end of this section, and we will try to be a clearing house for them.

Another problem that some people have with their Apple-CP/M systems is the need for custom programming. Sometimes after using a program for a number of years, there are just some features you would like to add. If the publisher is still in business you can hope for some help or an upgraded version. If the program is no longer being published, you are on your own.

Maybe you have a custom programming problem that defies an easy solution. There are just not that many people doing custom Z-80 programming these days. Maybe someone solved your problem five years ago and forgot about it. A short note to this column may jog their memory and the solution may be available.

Apple-CP/M, c/o *Computer Shopper*, PO Box F, Titusville, FL 32781.

Vendor Addresses

Advanced Logic Systems, Inc.
1195 E. Arques Ave.
Sunnyvale, CA 94086
(408) 730-0307

H & M Disk Drive Services, Inc.
1101 East Pacifico
Anaheim, CA 92805
(714) 385-1146

Bibliography Addendum

The Apple CP/M Book, Murray Arnow. Scott Foresman, 1985.

Finalists In Apple's Computer Clubs Competition Announced

Apple Computer, Inc. has announced 22 winners and runners-up in the third annual merit competition (Competition '86) of the Apple Computer Clubs International program. In Competition '86, Apple Computer Club student members and club advisors at elementary and secondary schools throughout the U.S. and Canada demonstrated excellence in computer applications development and use, and were recognized for their achievements.

The first prize winners of Competition '86 will receive an all-expense paid trip to Washington, D.C. June 28 through July 1. Steve Wozniak, co-founder of Apple Computer, Inc., will meet with the winners during their Washington visit and will present the award certificates at a banquet ceremony on June 30. While in Washington, the winners will exhibit their projects to invited guests and the public, and will participate in sightseeing, computer workshops and other educational activities.

Several hundred competition entries from the United States and Canada were accepted in four categories: Community Service, Basic Programming, Computers in the Curriculum and Judges' Choice. Winning entries were those that best demonstrated usefulness, overall excellence and the ability of club members to work together on a common task. Elementary, middle and secondary school computer clubs competed separately in each of the categories.

Finalists In Apple's Third Annual Computer Clubs Competition

Community Service:

Elementary School-

Country Apple Computer Club(Winner), Worcester Country School, Berlin, MD.

Crescent School Computer Club (Runner-up), Crescent Elementary School, Griffin, GA.

Middle School-

Nixa Junior High Computer Club (Winner), Nixa Middle School, Nixa, MO.

Woodbury Middle School Computer Club (Runner-up), Woodbury Middle School, Woodbury, CT.

Secondary School-

The Microworms Computer Club (Winner), Edinburg Middle School, Edinburg, VA.

Atchinson Computer Club (Runner-up), Atchinson Junior High School, Atchinson, KS.

BASIC Programming:

Elementary School-

Jennifer Sartory/Elizabeth Dodds (Winner), Tenacre Country Day School, Wellesley, MA.

Brian Terry (Runner-up), Willits Unified School District, Willits, CA.

Middle School-

Lans Carstensen/Jeff Forret (Winner), Calamus-Wheatland School, Wheatland,IA.

Jon Ostenson (Runner-up), Memorial Park Middle School, Fort Wayne, IN.

For more information contact Apple Computer, Inc. 20525 Mariani Avenue, Cupertino, California 95014; (408) 996-1010, TLX 171576 TWX 9103382054.

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Upgrading Kaypro continued from page 74

file by using CP/M TYPE to screen? CP/M TYPE is probably the most useless computer operating system command ever invented. A good TYPE command is definitely needed for most computer users. Say you are looking for a query letter that you wrote 18 months ago. I put all my query letters on the same disk, but I wasn't smart enough to give them all distinctive file names. My directory reads Query0.let Queryl.let, Query-2.let, etc. The only thing to do is open up each letter file and read the address. When I was young and naive, I used a WordStar to do that, but just before I went crazy I discovered that I could use TYPE, provided I could hit control S fast enough. When I sped up my Kaypro to 5Mz, my reflexes weren't fast enough. It is no wonder then that there are a million CP/M type programs in the public domain.

Another flaw of CP/M is the lack of a command to reload the last program from RAM. Suppose you have just exited WordStar, and the great idea hits you. You want to immediately reenter without having to think about the process. With CP/M you type WS and the disks start spinning. By the time WordStar is loaded, you've lost the rhythm.

Well there is a better way, or I should say better ways. There must be a dozen replacements for, or patches to, or shells for CP/M. A review of present and past issues of Micro Cornucopia reveals some interesting names: QPM, RPM, ConlX, MRS/OS, Okara, and Unica. In public domain there is the famous ZCPR. ZCPR is a patch designed by programmers for programmers. While it solves some of the CP/M problems it opens up others. For example, Kaypro users discovered that when they used Perfect Writer with ZCPR 1, using a control C sent them straight into a warm boot at the most inconvenient times. ZCPR didn't solve the problem of CP/M TYPE either.

Plu*Perfect Systems' CP/M 2.2E was developed as a commercial attempt to correct some of the defects of ZCPR. Like ZCPR, CP/M 2.2E is a Z80 oriented patch to CP/M rather than a completely new operation system. But CP/M 2.2E was designed to operate with Plu*Perfect's patch to Perfect Writer, Plu*Perfect Writer. In addition Plu*Perfect sells a set of system utilities for use with CP/M 2.2E that are very interesting in their own right. Undoubtedly 2.2E's most useful feature for a writer is its TYPE command. This command includes, among other features, forward and reverse scrolling, scrolling by line and page. A second feature is the GO command that automatically re-executes the last command. Finally 2.2E offers a drive search path. This path is unidirectional. When logged into drive B, drive B is searched for the required file and then drive A is searched. But Drive B isn't searched from drive A. This procedure makes more sense with a hard disk than floppy drives. Clearly for a two drive system cross searching would be better, but still it is an improvement over stock CP/M. The third valuable feature of the CP/M 2.2 command processor is the GO command that re-executes programs that still reside in RAM memory. This command repeats the last command executed by your system. Suppose you want to do a directory check on both drives with SD. Execute A>SD, then when the A> prompt returns, if GO B: is entered, SD is executed from RAM *memort without reloading from disk. The standard CP/M commands REName, SAVE, and ERASE have also had new features added in CP/M 2.2E.

Most beginning computer users are dimly aware of the Basic Input/Output System of their computer. CPM 2.2E alters the Kaypro BIOS in a number of important ways. First the type ahead buffer is altered to hold 12 characters. Since the 3 character CP/M buffer is inadequate for a fast typist this is a real boon for people who type faster than me. Plu*Perfect's Config program, CPMCONFG, is an improvement over the standard Kaypro CONFIG program. FASTCOPY has come too late for the many people who died while waiting for their Kaypro 4s to finish copying a disk. For those of us who have survived prolonged sessions using one of Kaypro's COPY utilities, this boon alone is worth the price of the whole Plu*Perfect Disk.

Plu*Perfect offers a number of utilities, that offer great improvements over the standard CP/M offerings. These include PUBlic, a program that makes files on hard disk accessible from other user areas, and PAGEREL.COM a utility for relocating CP/M that helps if you are using a RAM disk.

Added to the Plu*Perfect System utilities are a number of public software programs. These include SD—Super Directory, one of the best CP/M utilities in existence.

RPIP — Resetable PIP is an improvement over PIP, especially if you need to PIP from more than on edisk. EX is the well known public domain substitute for Submit, CP/M's batch copy program. FINDBAD is useful for discovering if a floppy disk has a bad sector and locking out bad sectors on newly reformated disks. Finally MAKE moves files between user areas on a hard disk.

If you are a fan of Perfect Writer, (I'm not) I suggest you buy the Plu*Perfect Writer disk. Plu*Perfect Writer adds some useful enhancements to Perfect Writer and the disk contains the CP/M 2.2E operating system patches and utilities. If WordStar is your cup of tea I suggest that you order the CP/M 2.2E disk which also contains the excellent WordStar Enhancements, a WordStar patch that allows the Kaypro numeric keypad to be configured for complex command sequences. Either disk costs under $40 and is a bargain considering that Plu*Perfect Systems supports their software, if sometimes a little feebley. But if you consider that DR has completely abandoned its 8 bit computer products, feeble support is better than none at all. CP/M 2.2E has by now gone through a number of revisions and most bugs have been removed from it. However, there are a few software programs, and a few rather rare hardware modifications to Kaypro computers that are incompatible with it. CP/M 2.2E is also incompatible with Kaypros using the U ROM. If you have any doubts about compatibility check with Plu*Perfect Systems first.

Plu*Perfect System offers another interesting software system, The Backgrounder. The Backgrounder is a keyboard translation program with Macro features plus something more. That something more is the ability to suspend a program to perform some other task. Thus the Backgrounder is a combination of Sidekick and Superkey for the CP/M computer. The Backgrounder also adds ZCPR3 like features to CP/M 2.2E. The Backgrounder features a notepad, help files, a print spooler, screen dumping to printer and to disk, and added CP/M command line editing capacity. In addition the Backgrounder access CP/M system commands.

The Backgrounder has its limitations. Even though the Backgrounder occupies a fraction of the memory of a MS-DOS resident utility like Sidekick, on a 64K computer system RAM is a rare commodity. To minimize memory use, Backgrounder functions are loaded in modules, but the basic module occupies 5k of upper memory. Due to clever coding, the Snappy module which adds screen dumping to printer and disk, and the notepad only requires another K. But on a 60k system like the Kaypro 10, loading these two modules leaves a TPA of 54K. For many applications that is tolerable, but for some it is not. For example WRITE is under such a system and is limited to 28K files, actually 26K, since the WRITE manual suggests avoiding use of the last 2K of file memory. I find that in writing a book length document, Turbo Pascal users will be faced with a severe crunch due to that language's the peculiar quirk related to system size. The Backgrounder may not be that useful for a writer. No experienced user of word processing would exit a file, even temporarily, without saving it. With WordStar it is very simple to do a Control KD and then use the R command to perform another function. The WordStar R command is actually more flexible for many uses, and unlike the Backgrounder has no memory penalty. WordStar 3.3 also has limited spooling capacity. WordStar Enhancements and Plu*Perfect Writer already supply numeric keyboard modifications without a memory penalty. (Plu*Perfect Systems plans to bring out a more flexible Backgrounder II.) The computer hacker or the user of application software such as spreadsheets, data bases and accounting programs may find the Backgrounder's capacity to temporarily suspending program execution for higher priority tasks of more use.

If the Backgrounder alone is not that useful for writers, the Backgrounder Accessory Kit does add some useful capacities. Printpad adds the capacity to redirect output to printer to a disk file. This allows formatted text to be stored on disk and later printed with Spool. BGPrint adds the capacity of custom formatting of texts for individual printers. This module can be used without the Backgrounder being present. And Calculator, another program which can be used with or without the Backgrounder, allows the Kaypro number pad to be used as a simple calculator. When used with the Backgrounder, the results can be inserted into the foreground files.

The Accessory Kit also contains Setkey and Addkeys Backgrounder modules, which among other capacities, converts the Kaypro keyboard to the Dvorak system. Snapgraf dumps certain Kaypro 84 graphics screens to a disk file. All in all, the Backgrounder Accessory Kit contains enough valuable features to make buying the Backgrounder worthwhile because it is required for using the Kit.

Retail price CP/M 2.2E is $32. Plu*Perfect Writer is priced at $39. The Backgrounder costs $45. And the Backgrounder Accessory Kit is priced at $25.

For info about Plu*Perfect Systems, Box 1494, Idyllwild, CA 92349.

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Diagnosis of bladder and urinary problems has been made faster and more accurate with a new computer-assisted test developed by urologists at the Medical College of Wisconsin and the Froedtert Memorial Lutheran Hospital in Milwaukee. It has been used in 750 cases to diagnose problems from diseases to abnormalities by its creators. A Digital Equipment Corp. Minx system is used along with custom software. A full work-up, including testing and analysis can be done in 1.5 hours.

Computerizing the Medical Profession.
Maremaa, T.
Popular Computing Vol.3, No.12, Oct. 1984, P. 88,91-92. 3 Pages.

Microcomputers have made it possible for small medical offices to be automated. The number of medical programs on the market has reached 1,500. There have been problems caused by systems which were marketed too soon. Doctors need systems which can manage a large database and at the same time provide information quickly. Updating and file maintenance is extensive and development of a smart card may be necessary. Some insurance companies are forcing medical offices to use computers by penalizing those with manual systems. Blue Cross/Blue Shield has an electronic claims processing system. Most medical packages on the market are billing programs. Large companies are now entering the market, including Digital Equipment, Texas Instruments and IBM. These companies can offer good support for their systems. Medical diagnostics is a new field. On-line telecommunications allows doctors to check literature. A United Nations commission is studying the possibility of a global information system.

Computers with Heart
Porter, M.
PC (Independent Guide to IBM Personal Computers) Vol.4, No.9, April 30, 1985, P. 173-174,177.

A Compaq portable computer played a key role in the second artificial heart implantation which took place in November 1984 at the Humana Hospital Audobon in Louisville, Kentucky. Its most important function was as a diagnostic tool to keep track of the operation of the Jarvik-7 heart implanted in William Schroeder. The original program was written in BASIC, then rewritten in C to run on an MSDOS machine instead of the original Apple IIe. The Compaq was chosen because of its size, since it had to accompany Schroeder as he moved about in the hospital. The manufacturer of the Jarvik-7 heart, Symbion of Salt Lake City, also developed the software. Photographs of the Compaq in use are included.

Computerized Anatomy Instruction.
Meals, Roy A.; Kabo, J. Michael
M.D. Computing Vol.3, No.1, Jan./Feb. 1986, P. 30-34. 5 Pages.

A proposed computer-based gross anatomy course of study is described to simplify the learning process by presenting the complexities of human anatomy in a more logical conceptual sequence than is possible through dissection. A recent study by the Association of American Medical Colleges suggested that in future medical education, the use of computer-based instruction will give students the ability to learn independently, which would reduce scheduled time and lecture hours, and promote independent learning and problem solving. The program developed here is a self-paced teaching package that uses computer-generated images controlled by branching instructional software on a personal computer. It uses a Genisco GCT 3000 color graphics system with a 512-by-480-pixel resolution and eight memory planes. After the data is transferred to an IBM 4341 minicomputer, higher resolution images will be produced on the IBM 5080 color workstation, and a videodisk system will be used to provide the instruction on a personal computer.

Computerized Clinical Decision Aids.
Wigton, R.S.
Nebraska, Univ. of College of Medicine, Omaha, NE
M.D. Computing Vol.2, No.5, Sept.-Oct. 1985, P. 37-39. 3 Pages.

Two medical societies have joined forces to share advances in software for medical applications. The Society for Medical Decision Making (SMDM) is a group of 600 physicians working toward improving the theory and practice of medical decision making. The Society for Research and Education in Primary Care Internal Medicine (SREPCIM) sponsors a 300-member user group that is developing a software library and newsletter. The two groups got together in November 1984 to demonstrate computer programs that assist in medical decision making. Tested programs included INTERNIST-I and ONCOCIN, which used artificial intelligence techniques, a system used for computer-aided diagnosis on a submarine, Decision Maker 5.3, one of the latest medical decision tree programs, and SMLTREE, a decision tree program that also creates and evaluates Markov models. Programs to assist analyzing data from large medical databases were also demonstrated.

Creating 3-D Models for Medical Research: Processing Images of Structures Never Before Seen.
Latamore, G.B.
Computer Graphics World Vol.6, No.5, May 1983, P. 31-34,36,38. 6 Pages.

A computer system at the University of Texas Health Science Center is creating three-dimensional colored solid models of structures in the human body never seen before. The software package creates accurate images and can compute size, volume and count the number of cells. Color figures of various structures are included.

Dbase II and the Surgeon.
Chellappa, M.
Chang Hospital, Sinagpore
Interface Age Vol.9, No.10, Oct. 1984, P. 44-45.

Data base software has been the most helpful tool for surgeons and other doctors. Clinical and surgical records of each patient can be kept. Retrospective analysis for any disease or surgical procedure can be rapidly done. A broad data base, however, needs to be designed and implemented. The Dbase II, version 2.4, data base management system from Ashton Tate was used to fulfill these requirements. A step-by-step procedure was used by a gastrointestinal surgeon at Chang Hospital in Singapore. An Apple IIe with a Z80 card was used to write the program. The program listing is given.

Dentistry Made Painless.
Gutkin, D.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.3, Feb. 21, 1984, P. 353-357.

This article recounts the experience of a practicing dentist with the Dental Office Management System known as the MS80. Both old manual and new computer systems were run concurrently for sixty days in this practice of three dentists with 11,000 patients. Two years later, the computerized system has proved very satisfactory. The list price is $2,400 in the United States and $3,800 in Canada.

Design, Implementation and Evaluation of a Microcomputer-Based Portable Arrhythmia Monitor.
Thakor, N.V.; Webster, J.G.; Tompkins, W.J.
Medical & Biological Engineering & Computing Vol.22, No.2, March 1984, P. 151-159. 9 Pages.

A compact, battery-powered, microcomputer-based monitoring system is designed for real-time cardiac arrhythmia analysis. The monitor is made up of an 8-bit CMOS microprocessor, 2Kbytes of EPROM, 2Kbytes of RAM, an analog-to-digital recorder, a battery-operated modem, and circuits for amplification and QRS detection. The RCA COSMAC microprocessor is used; however, an NSC800 may replace it. System software includes arrhythmia interpretation algorithms, a software clock, sampling and data compression software, and modem protocol. An electrocardiogram database is available to test the monitor. Several diagrams illustrate the architecture of the microprocessor-based monitor. Tables show arrhythmia detection criteria and results of evaluation of the monitor using various arrhythmia waveforms.

Detection Of Extracellular Action Potentials In Noise For The Control of Microelectrode Advancement.
Scobey, R.P.
Computer Programs in *Biomedicine* Vol.17, No.1/2, Aug./Oct. 1983, P. 3-10. 7 Pages.

The process of programming to detect impulse activity from microelectrodes is described. One victor is defined as time and amplitude differences between peak positive and negative potentials. The research sets up a mode system for signal detection in noise, gives digital representation of noise, defines vectors, describes signal detection and measures performance of the algorithm against a voltage comparator.

Diagnostic Problem Solving by Computer: A Historical Review and the Current State of the Science.
Kleinmuntz, B.
Illinois, Univ. of, Chicago, IL, 60680
Computers in Biology and Medicine Vol.14, No.3, 1984, P. 255-270. 15 Pages.

The progress of diagnostic problem solving by a computer has been slow but ongoing. Major studies in this area have been done on the analysis of clinical versus statistical predictions, artificial intelligence, and formal approaches to medical reasoning. Currently, some medical record systems assist in diagnosis and statistical analysis, including MUMPS, PROPHET, COMTRAC, CASNET, INTERNIST and MYCIN. The design of hardware and software that can handle the complexity of diagnostic problem solving is necessary before computers will be of vital importance in medical management.

Digital Paintbrush System.
Dowell, K.
PC World Nov. 1985, P. 259, 262, 266.

Digital Paintbrush System by Jandel Scientific is a low end medical CAD system for IBM PC compatible computers. It uses an electronic stylus to do graphics design, measurements, charts, and slide presentations. The program is functionally similar to PC Paintbrush and PC Paint, but comes with a stock of medical illustrations and chemical and electrical symbols. Digital Paintbrush System, which comes with many sophisticated features, retails for $450. A color screen display of a medical illustration is provided.

"Doctor, I Think Mr. Day Is Hypoxemic." "O.K., Let's Take a Look At His Blood-Gas Values..."
Helm, S.
Medicine & Computer Vol.1, No.3, Feb. 1984, P. 24-27.

Computers can help improve medical care by connecting the physician to remote data, to remote patients or providing physicians a link to each other for problem solving. Dr. William Chamberlin, associate director of the medical-surgical intensive care unit at Michael Reese Hospital in Chicago uses a home computer to call up information on the minicomputer of the hospital's intensive care unit. Dr. Donald Connelly, director of the laboratory data division of the University of Minnesota Health Service Center, chose a Control Data Model 110 microcomputer with a touch sensitive screen in order to develop the Pathlab Clinical Laboratory Information System, a user-friendly computer system that is facilitating better communications between physicians and the lab. Dr. Alan Kantor, medical director of the North Central Dialysis Center in Chicago, helped develop software that connects patient info between dialysis centers using a local area network. Any computer systems providing critical information must have a back-up.

Doctors Learn Via Diskette.
Bergheim, K.
InfoWorld Vol.6, No.22, May 28, 1984, P. 26.

Computerized Medical Education (CME) is marketing an interactive software series for

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general practice physicians. The twelve-case curriculum was developed in conjunction with the University of Washington School of Medicine. The continuing education program is based on the simulation of patients' symptoms and reviews current diagnostic techniques. Available on disk for the Apple II and IBM PC and compatibles, the series costs $360.

Dr. Com Puter's Report.
Anon
Medical Computer Journal Vol.3, No.6, 1984, P. 156-160. 5 pages.

Computer phobia disappeared in 1983 for the medical profession. A great deal of software was published in 1983. The trend for 1984 is a continuation of 1983. There will be more computers and fewer buyers. Bionet was announced. It is a National Computer Resource for Molecular Biology. Also announced is Epicardia, a computer that communicates with a patient. Keytronic Corporation has designed a keyboard for the handicapped.

DRG's Put New Jersey Medical Records in the National Spotlight.
Bennett, S.P.
Computers in Healthcare Vol.4, No.12, Dec. 1983, P. 28-29.

Hospital Computer Systems and a technical team from Riverview Hospital in Red Bank, New Jersey, designed a distributive system to help accomodate the DRG regulations. Features of this Medical Records system include index cards, discharge lists, on-line abstracts, a patient index, correspondence tracking, on-line exception lists, patient display by physician, patients by DRG, DRG edits, suspension letters, DRG charges analysis and management reports.

Elsevier Launches Software in Analytical Chemistry.
Anon
Online Review Vol.8, No.1, Feb. 1984, P. 22,24.

Elsevier's first software packages in a series dealing with analytical and clinical chemistry will be available in early 1987. REFVALUE will calculate reference intervals from hospital patient laboratory data. BALANCE will compare measurements (for example, of whether two different drugs will yield equivalent results in treatment). Still being developed are CLEOPATRA, a set of modules for chemometric education, and INSTRUMENTUNE-UP, a program that helps improve the performance of laboratory instruments.

Emergi-DOS.
Sea, C.; Clark, A.
Ochsner Hospital, New Orleans, LA
M.D. Computing Vol.2, No.4, July-Aug. 1985, P. 28-33. 6 Pages.

Emergi-dos is a collection of twelve BASIC programs from the American College of Emergency Physicians which cost $50. The programs are currently available for the TRS-80 Model 1/3/4 and for the IBM-PC and compatibles. These programs provide online calculations and information retrieval that are useful for emergency care. Pediatric calculates all the possible drug dosages required by a child in cardiac arrest. Respiratory covers acid/base, near-drowning, respiratory failure and aminophylline calculations. Metabolic is about electrolyte anomalies and therapy for dehydration. Patient instruction includes patient home care instructions. Environmental includes four programs dealing with hypothermia, snakebites, spider bites and burns. Toxicology covers seventeen classes of drugs and the symptoms produced by overdoses. Diagrams are included for various program decision trees.

Evaluating a Hospital Pharmacy Computer System.
Grohman, G.
Computers in Healthcare Vol.4, No.12, Dec. 1983, P. 42-43.

When evaluating a pharmacy computer system both clinical and managerial capabilities should be considered. Software, hardware, flexibility and system support are critical factors. Some important software features are mainframe interfacing capabilities, inventory control, drug/IV/allergy interaction, twenty-four hour per day, seven day support, clinical capability, access to future enhancements, computer hardware integration and existing users groups.

Examining the Medical Market.
Rothfeder, J.
Computer Merchandising Vol.3, No.6, Nov. 1983, P. 162,166,168-169. 3 Pages.

Computer retailers are beginning to become specialized and carry profession-specific products. One lucrative area is medicine, although some retailers feel uncomfortable selling to doctors. APT, Inc. a software firm, specializes in medical applications software. Other manufacturers use expert in-the-field salespeople to reach doctors. MAI/Basic Four offers special training to retailers dealing in the medical market. Articulate Publications also trains its retailers who, in turn, hold seminars for customers. Many doctors report wanting to computerize, but also indicate they do not read computer magazines because most do not address medical applications. Clearly, the computer industry will have to aggressively "court" the doctors.

Exchange Chaos for Order.
Helm, S.
Medicine & Computer Vol.1, No.2, Jan. 1984, P. 28,30+. 3 Pages.

Physicians have had both bad and good experience in computerizing their offices. A pediatric cardiologist bought a Medpac office management software package, ran it on an Apple II with 30 Mbytes of hard disk drive capacity and has been able to store 17 years of patient information. A solo practitioner in El Paso, TX bought an IBM PC and the CYMA medical office management system. The program was full of bugs and handled only financial aspects of an office. The vendor claimed there were exaggerated expectations. A member of an Atlanta internal-medicine group advocates buying canned software and gradually easing into computerization. A physician high tech aficionado bought a Charles Mann Associates (CMA) billing package and says the program has too many features, which probably slows the system down. CMA customer support was excellent though. An internist who now reviews medical software packages believes the only way to evaluate a package is to put thousands of records on it over six months. The new and enhanced package coming out from medical office systems vendors are beginning to more closely match users' needs.

Exchange of Environmental Health Information between Microcomputers.
Eckert, R.R.; Pabon, J.R.
Catholic University of Puerto Rico, Ponce, Puerto Rico
International Journal of Bio-Medical Computing Vol.15, No.3, May/June 1984, P. 183-197.

Two communications programs are described which permit the transfer of disk files of epidemiological data gathered over a five year period. An RS232-C serial post was used to transfer data between a TRS-80 Model III and a TRS-80 Model I system. The Model I facilities desired included word processing and computational capabilities. A program is described which controls each computer during the data exchange. Future plans include communications between other micros and large computer systems.

Fast Relief: Practice Management Software and DEC Rainbows Help Doctors Put Paperwork in Its Place.
Lubonsky, B.
Digital Review Vol.2, No.5, Feb. 1985, P. 83-86. 3 Pages.

Three of the eighteen medical practice management packages for the Digital Equipment (DEC) Rainbow 100, Medical Office Management from Univair International, Medical Practice Management from Cyna, and the Medical Manager from Systems Plus, are evaluated. Univair's package has three versions available, is menu driven, and costs $995. Cyma's $1,750 package has a well-written manual and provides front-office management. Systems Plus' $3500 program is a large, comprehensive system. All three require creating support files and then entering data. The first two are mainly for office management while the third can also handle diagnostic work. A comparison table and three sample output reports are shown.

First Aid
Huse, S.M.
Compute's Gazette Vol.2, No.10, Oct. 1984, P. 95, 159-163. 4 Pages.

First Aid is a menu-driven program for the Commodore 64 microcomputer. It provides a tutorial on suggested first aid for major and minor medical emergencies. There is also room to hold critical emergency phone numbers. The program should be used as an educational tool. The complete program is listed.

Four-Dimensional Processing Tools for Cardiovascular Data.
Wixson, S.E.
University of Alabama at Birmingham
IEEE Computer Graphics and Applications Vol.3, No.5, Aug. 1983, P. 53-59. 7 Pages.

Cardiac data involves four dimensions: three space dimensions and time. A system configured from multiple processors, a large memory and disk and tape storage, and a 512x512x512x32 four-dimensional display. The system has four subsystems: developer, processor, display, and disk storage. The developer and processor are based on Texas Instruments 990/12 CPUs with custom five-by-six foot graphics digitizer with display, high speed, parallel input/output module, and selector channel emulators. The four-dimensional display uses binocular stereo techniques. The time dimension is generated via a bulk memory that stores the stereo pairs. Both mechanical and visual cursors are used. GWCORE is the graphics software base. Diagrams of the system are included.

Fractures of the C-1 Vertebra: Report of Two Cases Documented with Computed Tomography.
Swartz, J.D.; Puleo, S.
Medical College of Pennsylvania and Hospital, Philadelphia, PA, 19129
Journal of Computed Tomography Vol.7, No.3, Aug. 1983, P. 311-314. 3 Pages.

Diagnosis of vertical fractures of the C-1 vertebrae by computed tomography (CT) is examined. Two cases illustrate the use of the digitalized lateral localizer image and the high resolution bony and soft tissue software package in this fracture diagnosis. CT photographs illustrating the vertebrae are included.

Health And Efficiency.
Naylor, C.
Practical Computing Vol.7, No.4, April 1984, P. 74-78. 5 Pages.

Home medical computer programs must have a limited aim. A general- purpose doctor program that makes diagnosis is impossible for the home user due to the inability to answer medical questions with sufficient accuracy. Several medical programs do exist, however, for the home user. "Help" produces a health profile of the user and recommends an exercise program to improve fitness. "First Aid" teaches young people the basic elements of first aid for emergencies. "The Home Doctor" is on six cassettes with over 100 programs aimed to help users determine whether or not to seek medical help based on their symptoms. "How Long Have You Got" uses medical statistics to determine the user's life expectancy. *The Complete Guide to Medicine* is a computerized text book. "The Wellness Check" was designed as part of a community program to point out the areas of an individual's lifestyle that need modification based on responses to forty-seven questions. A chart lists the format, price, supplier and machine each of the five programs runs on.

Healthcare Vendor Directory.
Anon
Computers in Healthcare 1985 Market Directory Edition, Vol.6, No.9, 1985, P. 10,12,14+. 42 Pages.

A directory is provided on computer systems and supplies for the health care industry. Systems in development as the

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market directory went to press are also included. Vendor information includes demographic descriptions, services provided, system requirements, target market by type and size, and the national, regional and international market territories that the vendor supports. Computer systems are classified as turn-key, stand-alone, time sharing or combinations of the three.

Hospitals Don't Buy Many Personal Computers.
Henry, H.; Gilbert, B.
Market Information Center, Framingham, MA
List Vol.11, No.3, March 1984, P. 36-37.

In November and December 1983, a survey was conducted to determine where personal computers are used in hospitals and to locate potential markets for software suppliers. Potential suppliers should be aware that there are only about 7,000 hospitals in the United States and most are not highly profit-motivated. The survey found four major application areas with promise and future market growth: laboratory, financial, diagnostic and physicians. Pie charts illustrate the relationship between hospital size and personal computer use.

How to Choose a System
Anon
Medicine & Computer Vol.1, No.2, Jan. 1984, P. 34-35.

Billing is the function that should be scrutinized most closely when shopping for an office management system. It should not only speed third party billing but it should be flexible for adjustments in payment and billing, it should reduce errors and be capable of submitting insurance claims in digital form via tape, floppies or phone lines. Other features that should be considered are the inclusion of hard disk drives in the system, the ability of the software to search records by name or number, real time interactive billing and the elimination of duplicate data entry. Data base management systems incorporated into an office system allow physicians to track incidence of diseases, outcomes of treatment as well as demonstrate patient mix changes. It's better to buy a system from a vendor with a track record but if you're going to be first make it worth your while financially. Sources available to help physicians choose a system are the American Medical Association, The American Academy of Family Physicians and The American Society of Internal Medicine.

How to Sell to Doctors.
Good, P.I.
Software Retailing Vol.2, No.2, Dec. 1983, P. 33-34,39.

Selling software to doctors will involve a large investment of time for training and after-sales support. Retailers will need to be thoroughly familiar with the doctor's needs and the software's capabilities. Medical Manager is an integrated system which is flexible enough for large practices. It sells for $3000.00. Although less flexible, the Physician's Office Computer is a multi-user system with good documentation, retailing for between $5000.00 and $10,000. One of the chief problems with RCI's Dental and Medical Management is that it runs on the Oasis operating system, thus limiting its use to less popular, 8-bit machines. Practices with an Apple can use Spectral Soft's Comma billing system. CMA Microcomputer offers a variety of customized packages, although much after-sales support will be required.

IBMs in the Lab: Programming Experiments
Martin, L.; Jeffreys, B.
Mount Sinai Medical Center, Cleveland, OH
PC (Independent Guide to IBM Personal Computers) Vol.3, No.19, Oct. 2, 1984, P. 285-286,288.

The Pulmonary Division of the Mount Sinai Medical Center in Cleveland uses XTs and PCs to provide better and faster service. The microcomputers are used to help the lab in performing 30,000 arterial blood gas tests a year. The custom software was written by staff members.

Implementation: The Microcomputer in a Pharmacy.
Jackson, J.
Interface Age Vol.8, No.3, March 1983, P. 48-50,172.

A pharmaceutical system using software from Pharmacom running on an Altos ACS 8000 microcomputer with a Bantam terminal and a Centronics 781 Printer is reviewed. The history, progression, upgrades and success of the system are discussed. Included is a table of time comparisons between manual and computer routines commonly used in a pharmacy. There are included a sample label and billing printout. Finally there is a screen display of a typical query and response sequence.

In-Search.
Elia, J.J.Jr.
New England Journal of Medicine
Popular Computing Vol.4, No.1, Nov. 1984, P. 149-150,151.

Menlo Corporation has released In-Search, a software package designed to simplify searches on Dialog. Dialog's costs are high. In-Search operates with category disks for the arts, education, and social sciences; biology and medicine; business, government and news; engineering, mathematics, and the physical sciences. These disks serve as guides to the data bases. A data base can be chosen before the connection to Dialog is made. After the connection is made, In-Search lists the relevant articles. A chart outlines features of the package.

Inevitability of a New Practice Associate
Singer, J.A.
Computers in Healthcare Vol.4, No.10, Oct. 1983, P. 74,76.

Physicians who can use computers, software and available databases will have an advantage over those who can not take advantage of new technologies. Computers can provide efficient appointment scheduling, expedite accounting and billing and reduce office paperwork volume. Although recent programming advancements have produced logic based database systems, the role of the computer should be in assisting physicians in making clinical diagnoses rather than dictating clinical decisions.

Insights: An Exciting (and Prosperous) Future.
Anon
Electronic Imaging Vol.3, No.3, March 1984, P. 68-70. 3 Pages.

Consumer electronics sales are predicted to hit thirty-four billion dollars by 1987, and fifty-eight billion dollars by the mid 1990s, with audio components, TV and video equipment leading sales. Potential growth lies in home companions such as robots, security systems, and home computers. Business graphics with higher display resolution and more color will be a growth leader; sales are expected to hit $1.8 billion for graphics software alone by 1987. Total business graphics market is expected to top ten billion dollars in 1987, up from $1.3 billion in 1982. Lasers, having shed the science fiction label, are finding ways into many non-military business sectors, and are predicted to reach $665 million by 1987, which is only the beginning. Medicine and science will be the fastest-growing market, at 31 percent through 1987, accounting for forty percent of the market total by 1995. Graphs illustrate market statistics.

International Medical Corporation's Multi-Med.
Anon
UNIX World Vol.1, No.5, Oct. 1984, P. 122.

International Medical Corp. has introduced a centralized medical and administrative information system. Reports for twelve-lead resting electrocardiograms (ECGs), Holter ECG test and exercise ECG test can be generated. The management software, terminal, printer and 10Mbyte mass storage starts at $17,000.

Job-Specific Applications.
Seger, K.
PC World Winter 1984, P. 214-215,217+. 33 Pages.

Job-specific software packages are programs designed to be used in a specific work environment. A buyers guide presents several categories of job-specific programs. Five programs are listed for agriculture, forty-eight in engineering and construction, eleven in insurance, six in legal applications, twenty in manufacturing and industrial applications, and thirty-one in medical. In property management sixteen are listed, twenty-four in real estate, six in retail sales, seventeen in science and mathematics, and thirty-three in a miscellaneous category.

Laboratory Instrument Interface System (LIIS): A Unit for the Acquisition, Temporary Storage and Transfer of Data to a Microcomputer.
Danforth, D.R.; Stouffer, R.L.; Bosnos, M.
Arizona, Univ. of, Tucson, AZ
Computers in Biology and Medicine Vol.15, No.2, 1985, P. 95-96,99+. 4 Pages.

A laboratory-instrument interface system (LIIS), was developed to connect lab equipment with a computer. It was designed around an STD bus microcomputer, using a Z80 based CPU, two ST 4302 serial boards, and one ST 4203 64K dynamic memory board. The computer was a Zenith Z-100 color, with 128K RAM, and two 320K, 5.25 inch disk drives capable of being connected with lab equipment through the buffer with a RS232C interface. During data acquisition into the buffer, the computer is free to perform other tasks. The buffer transmits one character at a time with the computer echoing these characters back to the buffer in order to receive the next character, virtually eliminating human errors. Software was developed on a CP/M-based system using Microsoft's M80 package, with the download program from the buffer written in BASIC. This flexible, fast and versatile system was built by Michael Bosnos in the University Instrument Shop at the University of Arizona at a cost of about $2,000. Schematic drawings, block diagrams and photographs illustrate the methods used.

LABSYS: dBASE II for the Clinical Laboratory.
Anon
Data Based Advisor Vol.2, No.11, Nov. 1984, P. 47.

dBASE II RunTime, from Ashton-Tate, is the ideal for scheduling, keeping track of and issuing thousands of reports of patient tests. The LABSYS system was developed to implement dBASE II for such clinical laboratory applications. The system uses a 10M-byte hard disk, an IBM PC or compatible, and several printers.

LABSYS: dBASE II for the Clinical Laboratory.
Anon
Data Based Advisor Vol.2, No.11, Nov. 1984, P. 47.

dBASE II RunTime, from

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Table III
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Law: Patents Should Be Good Medicine for Software.
Swartz, H.
Business Computer Systems Vol.2, No.12, Dec. 1983, P. 29-30.

There is much controversy as to whether or not patent law is the best way to protect software. However, it appears to be the strongest technique available. Patents protect against anyone who makes, sells or uses a patented item without permission. Patents are also clearly worded and offer protection for seventeen years. The problem is in determining whether or not software is covered. Currently, the Patent Office has discouraged patent protection for software. However, some legal experts feel that is changing. Harrison E. McClandish, an Arlington, Virginia attorney, cites recent Supreme Court decisions in Diamond vs. Diehr and Diamond vs. Bradley to support his theory.

Leg Exerciser for Training of Paralyzed Muscle by Closed-Loop Control.
Petrofsky, J.S.; Heaton, H.H.III; Phillips, C.A.
Wright State University, Dayton, OH
Medical & Biological Engineering & Computing Vol.22, No.4, July 1984, P. 298-303. 5 Pages.

Muscle stimulation in paralyzed individuals can prevent muscle atrophy and bone demineralization. A computer-controlled device can be used for sequential activation of muscles. The patient sits in an exercise chair with surface electrodes placed over the muscles. The tension developed in the muscle is used by the computer to determine the maximum isometric strength of the muscle. The controlling software consists of a section that measures the threshold voltage and a voltage to produce maximum muscle contraction. A series of one second pulse trains are then applied and the muscle strength measured. The exerciser is found to increase muscle strength faster than bone size and bone density. The Apple II stimulator control board is described in detail and diagrams illustrate all of its components. A photograph shows the exercise chair and a graph reveals the increase in leg strength in paralyzed subjects.

Letter Frequency Distribution—Cryptology, Part IV; Series.
Andreassen, K.
80 Micro No.41. June 1983, P. 190,192+.

In common English, there are certain distributions of letters which remain consistent. The pattern varies for certain journals and professional languages (law, medicine, military). Plaintext can be entered into the given program, and the text profiles can be analyzed. Ciphertext can be run through the program to analyze the correspondence between the original and the substituted letter. The more text that is given, the easier it is to find a solution.

LIST Applications Software Locator Directory.
Anon
List Vol.11, No.3, March 1984, P. 1L-23. 23 Pages.

The applications director lists nineteen microcomputer software packages for the medical/dental industry. The directory entries are categorized as chiropractic, dentistry, and medicine and health care. Entries give a brief application description, the computer model and/or operating system it runs under, and vendor information. The directory has an alphabetical index by product name. It also indexes the software by operating system and by computer model.

Manufacturer's Response.
Dolan, D.M.
Medware
M.D. Computing Vol.1, No.2, 1984, P. 24.

The Specialist, from Medware, was developed for use on a small computer system in the medical areas of anesthesia, surgery, internal medicine, radiology, and the small- and medium-sized family doctor practice. The billing system provides outstanding search capabilities, insurance forms generation, data entry and report formatting, single key entry customization, data security, and procedure and diagnostic codes. It promises flawless operation and state-of-the art features. The accounts receivable can be reduced by forty percent.

Marketing Computers in an Era of Skepticism
Ladd, S.
Medicine & Computer Vol.1, No.2, Jan. 1984, P. 66-69. 3 Pages.

The first computer, Eniac, was developed in 1946 in a University of Pennsylvania laboratory. Edvac was an improvement on Eniac in that it could store programs. Most early computers were used for defense agencies and federal record-keeping. John Mauchly and J. Presper Eckert produced a commercial computer called Univac. Univac's accurate initial projection of a presidential election convinced many skeptics that computers had come of age. In 1948 William Shockley, John Bardeen and Walter Brattain developed the transistor. The transistor shrunk the size and energy requirements of computers. This new technology convinced corporations like IBM that it was feasible to market computers. The medical profession had remained on the sidelines because of the expense of hardware and software coupled with delays in receiving computer processed information.

Matching MARC to a Picture Collection: Development of a Computer Format for Medical Illustrations.
Roberts, J.
University of California, San Francisco, CA 94143
Information Processing & Management Vol.19, No.3, 1983, P. 131-139. 9 Pages.

Current machine-based formats are deficient in their ability to identify, catalog, and retrieve illustrations and slides used in the health sciences. National cataloging standards have also been found to be limited in their usefulness when applied to this kind of material. The library at the University of California, San Francisco, found it possible to adapt a Library of Congress Machine Readable Catalog format that generates a subject authority list. These programs provide descriptive cataloging standards and a method for using MARC records to produce a catalog or index. Format definitions and subject authorities were developed through the use of MESH (Medical Subject Headings) and SNOMED (Systematized Nomenclature of Medicine) subject lists. Extensive revisions or reprogramming should not be necessary in future expansions of this system. A summary of the UCSF MARC illustrations format is included.

Medaccount: A Medical Accounting Package.
Cushing, M.Jr.
Lawrence General Hospital, Lawrence, MA
M.D. Computing Vol.2, No.1, Jan.-Feb. 1985, p. 51-55,67. 4 Pages.

Medaccount by Texas Instruments Inc. is a dedicated medical-office management system that runs on a Texas Instruments' professional computer. Medaccount version A3.00 was tested running under MS-DOS 1.25. It sells for $2,500. The hardware, data entry features, cursor control, editing, menu, error messages, graphics, documention, and program design were rated very professional in quality. The charge and payment features were not flexible enough. The insurance billing was rated good. The patient billing did not list who paid what or when payment was due. The appointment scheduler needed improvement. A calculator keypad window is built-in. With the weaknesses corrected, the system could be recommended enthusiastically. Five screen displays illustrate some of the program's features.

Medical Diagnosis with a PC Twist
Lener, J.
PC (Independent Guide to IBM Personal Computers) Vol.4, No.9, April 30, 1985, P. 215-217.

Several programs called Problem Knowledge Couplers (PKC) and a related series of packages from PKC Corp. aid physicians in making diagonoses, keeping medical records, and collecting clinical data. The PKC Development System allows a doctor to customize the data base. The system can be used to track causal relations between symptoms, diagnoses, and treatment. The components of the system can be purchased separately, or as a unit for $1495. The system is designed for the IBM PC with at least 128K of RAM and two double-sided disk drives.

Medical Record System: CSI.
Anon
Computers in Healthcare Vol.4, No.12, Dec. 1983, P. 56.

MedRec File, introduced by C-Systems, Inc., automates Medical Record related jobs by creating an integrated data base on all patients on admission and by combining this information with clinical data upon discharge.

Medical Records and Clinical Databases: What is the Difference?
Blois, M.S.
California. Univ. of (San Francisco), San Francisco, CA
M.D. Computing Vol.1, No.3, 1984, P. 24,26-28. 4 Pages.

Software systems which are useful to physicians are of two types: programs for keeping medical records and programs which support clinical databases. Medical record systems are used by the physician for patient care, while a clinical database is used for other purposes, such as data collection and analysis. There will be differences between programs in detail level of information to be recorded, and in the way time is represented. There is also a third difference of organizational style. Record keeping systems of any type require a commitment of time and effort in order for them to provide significant results for the user.

Medical Records in the Office.
Drury, B.M.
Pricare, Littleton, CO
Computers in Healthcare Vol.5, No.11, Nov. 1984, P. 64,66.

Improved cost and efficiency lend the computer to applications in the medical office. Electronic storage of records is cheaper, more efficient and easily retrievable. There is a variety of software products for managing medical records, and potential buyers should clearly define their needs before purchasing software. A table of different kinds of packages shows what each type provides.

Medical/Dental.
Anon
Software Retailing Vol.1, No.11, Sept. 1983, P. 59.

Four new medical software packages are reviewed. Medical Manager requires CP/M 80, CP/M 86 or MP/M-80 and sells for $3,500, single user or $4,000, multi-user. Medical Practice System, for the IBM XT and MS/DOS systems, addresses all aspects of a practice. Medical Insurance Form Writer, sells for $100 and is available for Apple II or IIe. Doctor's Office Companion is now available in CP/M hard disk version.

Merging Medicine With The Micro.
Porter, M.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.3, Feb. 21, 1984, P. 157-161.

Trinity Computing Systems is a software development company which is introducing microcomputer systems in hospitals. Trinity translated all its software to run on the PC and is setting up networks for clinical and administrative applications. The PC is designed not to make a diagnosis but to detect disease trends and perform complex calculations.

Method for Mapping Cardiac Arrhythmia in Real-Time Using Microprocessor-Based Systems.
Ruiz, R.; Hernandez, C.; Mira, J.
Universidad de Santiago de Compostela, Spain
Medical & Biological

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Table III
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Engineering & Computing Vol.22, No.2, March 1984, P. 160-167. 8 Pages.

An 8-bit microprocessor system maps cardiac arrythmias in real time by extracting rhythm and morphology characteristics from the QRS complex. An MC6800 microprocessor is connected to three peripheral interface adapters, a 2Kbyte static RAM, two 2Kbyte EPROMs and a 2Kbyte ROM. The software is made up of initialization, complex detection, and waveform and rhythm analysis routines. Classification boundaries for diagnosis are established by analyzing a training set of electrocardiogram records. The method is found to be faster and more discriminating than other methods. Included are diagrams of the system and a flowchart of the software execution sequence. Electrocardiograms and graphs illustrate the detection algorithms.

Micro Saves Hospital Time and Money
Regnante, R.E.
Queset Software, North Easton, MA
Medicine & Computer Vol.2 No.1, Jan./Feb. 1985, P. 22,24-25.

The cardiovascular laboratory at Cardinal Cushing Hospital acquired an Apple IIe computer and Computascan software to perform imaging of the carotid artery as part of diagnosing carotid artery disease. The low cost system, about one-tenth the cost of a duplex carotid scanning system, images both a lateral and a cross-sectional view of the artery at the same time, and is more accurate and requires less time than systems imaging one view of a time. The initial success of the system led to the acquisition of additional software and then to the development of custom written programs to accomplish tasks that might otherwise have required additional specialized equipment.

Microprocessor-Based Heart Monitoring
Kapur, P.
CEERI, Pilani, Rajasthan, India
Microprocessors and Microsystems Vol.7, No.1, Jan./Feb. 1983, P. 29-32. 4 Pages.

Heart conditions are monitored in intensive care units. A microprocessor-based heart monitor is described. The monitor's software and hardware are described with a circuit diagram, a block diagram, and an algorithm. The monitor determines the stroke volume, mean pressure, heart rate and cardiac output. The monitor is very useful in clinical diagnosis.

Micros Invade Nuclear Medicine: Add-on Boards Give PCs Power to Process Diagnostic Images.
Porter, R.J.Jr.
Computer Graphics World Vol.8, No.12, Dec. 1985, P. 54-55. 2 Pages.

The Albany Medical Center's Department of Radiology has developed an IBM PC XT-based system for capturing and analyzing nuclear emission images. Add-on boards from Data Translation Inc. interface data from a gamma camera with the XT to display the false color or monochrome image. These images may be enhanced in several ways with the addition of image processing software.

My Search for Medical Software
Paul, G.H.
Computers in Healthcare Vol.5. No.1, Jan. 1984, P. 50,53+.

In this case study of a computer system search for a medical office the list of requirements were user-friendliness, increased productivity, accounts receivable management, insurance form generation, on-line inquiry and good vendor support. The system that met these requirements was the CARE/DM system offered through SSP Time Share.

Needs and Uses
Douglass, R.J.
Los Alamos National Laboratory
IEEE Spectrum Vol.20, No.11, Nov. 1983, P. 41-45. 4 Pages. Currently available technologies should allow fifth generation computers to produce commercial results by the early 1990s. Advances in integrated information-management systems, new computer architectures, and improved human-machine interfaces will make these new applications possible. Integration of separate systems will allow greater automation in industry and offices. Expert systems will aid problem solving in science, engineering, and medicine. Software production will be improved by automatic programming and very high-level programming languages. Other applications in aerospace, the military, consumer services, health care, and even arts and leisure will be made possible in the future. These are all examined in a chart.

New Approaches to Practicing Medicine.
Friedman, B.
PC (Independent Guide to IBM Personal Computers) Vol. 4, No.11, May 28, 1985, P. 297-299.

CME Inc.'s Computerized Clinical Simulations for Continuing Medical Education is a series of programs designed to simulate clinical experiences in order to help doctors enhance their knowledge of a particular condition. Twelve programs are currently available. The topics covered include: abdominal pain in a young girl; fatigue and fever in a thirty-eight year old man; high fever in a seven-month old child, chest pain in a thirty-year-old man, and diarrhea and vomiting in an infant. Each program costs $40.

New Game Takes Its Medicine—Seriously.
Garry, G.
Educational Computer Vol.3, No.3, May/June 1983, P. 55,72.

Killer T-Cell is a video game that teaches how cancer cells can be killed. Players track cancer cells and use the T-Cell (T-lymphocyte) to kill them. Cancer cells multiply, and if the T-Cell cannot kill them, players can use drugs and chemotherapy, although this loses points. Chemotherapy can not kill all the cells, and if a player loses he suffers a "relapse," and starts over at a lower level.

New Products: Science.
Anon
Library Software Review Vol.3, No.1, March 1984, P. 109-111.

Seven science software packages have been announced by their publishers. Galileo is an adventure game in which students aged twelve and older explore optics. Its cost is $34.95, and it runs on the Apple and Commodore 64 micros. In Galactic Magellan, students aged eight to adult create and explore galactic space by using the stars. For use on the Apple, Atari, Commodore 64 and PET, IBM PC and TRS-80 models III and IV, its cost is $34.95. In Micrometer, students learn to increase their reading speed and accuracy by using a micrometer. It is for use with the Apple, Atari, PET and TRS-80. Bearings uses the computer to calculate and print out distances to five hundred cities worldwide. It is available on the IBM PC or Apple II/III computers, at a cost of $19.95. Plato's Cave is a game for players aged eight through adult in which they learn to find and analyze information. It costs $49.95 and runs on the Apple, Atari, Commodore 64 and PET, IBM PC and TRS-80 Models III and IV. Adventures in Flesh teaches physiology and anatomy via an adventure game. It costs $49.95 and runs on Apples. Anatomy Quiz provides a series of questions for use by students in medicine, nursing, biology, and allied health and physical education. The first three volumes cost $19.95, and the fourth costs $39.95. It runs on micros with 48K and Applesoft.

New Twist on Thermography.
Jekel, L.; Berke, L.M.
Medicine & Computer Vol.1, No.5, July/Aug. 1984, P. 10-12.

Thermography in detection of breast cancer has not been widely used in recent years but a new computerized thermography process may renew interest in this technology. Computerized Breast Thermography is a software package using standard contact thermography methods to analyze images. The program is based on a database of studies on approximately 158,000 subjects.

No Glitter, but Strong Substance.
Friedman, B.
Medicine & Computer Vol.1, No.7, Nov.-Dec. 1984, P. 18-19.

Doctor's Office Manager, IBM's packaged software for medical practice management, runs on an IBM-PC XT, is easy to get operational, and is a technically sound, carefully written package. Although it does not break new ground in practice management, it provides all of the usual features plus a number of additional ones such as: preventing users from pressing the wrong key when going from menu to menu; a section called "Correspondence" allowing ninety-nine different form letters to be sent to people in various computer resident files; Clinical Management, which allows retrieval of lists of patients based on specific data fields; and reasonable security for stored data. There are also shortcomings, including: limitation to the balance-forward method of accounting; limitation of patient entry to the patient maintenance section, and a limit of two insurance codes for each procedure. A sample patient data display screen is included as an illustration of the package which is available from IBM for $2500.

North Carolina Baptist Signs with HIS.
Anon
Computers in Healthcare Vol.5, No.6, June 1984, p. 14,16.

Health Information Systems Inc. (HIS) has contracted with North Carolina Baptist Hospitals Inc. (NCBH), a 701 bed hospital with another 105 beds being added, for the installation of the HIS Patient Accounting System. The patient accounting system is based on HIS's database architecture in which a single file and mainframe contain all information for a patient. HIS and NCBH have also agreed to a joint venture for the development of a patient care system that will be completely integrated with accounting system.

Nutrition Consult.
Anon
M.D. Computing Vol.2, No.4, July-Aug. 1985, P. 16-17.

Nutrition Consult software packages, from Nutrition Consultants, come in three modules: NC1, Recipe Scaling ($300); NC 2, Costing, Production, Menu Management ($600); and NC 3, Nutrition Analyses ($600). It runs on the Tandy 200, IBM XT, IBM PC (hard disk) and Texas Instruments or other MSDOS systems that can handle dBASE II and have at least 2Mb hard disk storage. The programs are easy to use and produce reports that are easy to understand. Data entry can be by food name or code number.

Obstetrical Ultrasound System: Trinity.
Anon
Computers in Healthcare Vol.4, No.1, Jan. 1983, P. 56.

OBUS, a Decision Technology trademark and marketed by Trinity Computer Systems, is a software product that uses IBM or Apple II microcomputers to perform obstetrical ultrasound. The OBUS system speeds up and enhances ultrasound interpretation and reporting.

Office Medicine.
Friedman, B.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.18, Sept. 18, 1984, P. 317-319.

Threshold is a medical billing package for the IBM PC from Physicians Practice Management. The program is menu driven and admirably crisp and concise. List price for Threshold is $5500. Articulate Publications' Medicalis is a relaxed medical billing program that lists for $2700. It is not as easy to use as Threshold but is more malleable.

Office Practice Management: A Directory of Medical Software Vendors.
McDonald, C.J.
Indiana University Medical School
M.D. Computing Vol.1, No.4, 1984, P. 31-37. 7 Pages.

There are a lot of software packages available for use by doctors in their offices. Most of the software is office related. Some are clinical. A six page

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Table III
continued from page 228

listing is included detailing the company's name, address, and the software package name.

On the Job; AI's Where It's At
Anon
Datamation Vol.31, No.14, July 15, 1985, P. 122.

There has been a trememdous increase in demand for personnel in the area of artificial intelligence (AI), according to Daryl Furno of Halbrecht Associates (Stamford, Connecticut). Almost two hundred companies are working on artificial intelligence and software related to geology, medicine, and finance. Experts will be needed in all these areas. Furno warns, however, that anyone contemplating a job transfer, should thoroughly investigate the new company, and try to find out if AI experts are included in an advisory board, if the top management includes people with experience in the company's specialty, and if the managers are marketing oriented.

On-Line Analysis of Neuromuscular Bioelectric Potentials.
Quint, S.R.; Howard, J.F.; Antoni, L.
University of North Carolina School of Medicine, Chapel Hill, NC 27514
Computer Programs in *Biomedicine* Vol.16, No.1/2, Feb./April 1983, P. 3-12. 10 Pages.

The study of tiny electrical potentials in neuromuscular tissue can be helpful in understanding related diseases and in observing the effects of certain drugs. Data is collected by microelectrodes inside the cells. Pre-and post-synaptic events can be understood by knowing the end-plate potentials (EPP), the miniature end-plate potentials (MEPP) and the action potentials (AP). Distinctive waveforms can be captured in a circular buffer. The software support functions such as storage and retrieval of data, display of waveforms, and data editing are menu-selectable. Block diagrams show the interface of the biologic and on-line systems, and the operation of the data acquisition system. Printouts show waveform parameters and statistical compilations.

PC-File for Physicians.
Hepler, K.E.
PC (Independent Guide to IBM Personal Computers) Vol.3, No.2, Feb. 7, 1984, P. 301-302.

PC-File is a program for the IBM-PC that helps a physician use the PC to keep track of patient data. The program is explained field-by-field. Instructions are given on how to best utilize PC-File. The address is included to write for a copy of the program. ●

Spotlight on Medical Resources will be continued next month. We also plan to issue the complete article in the near future.

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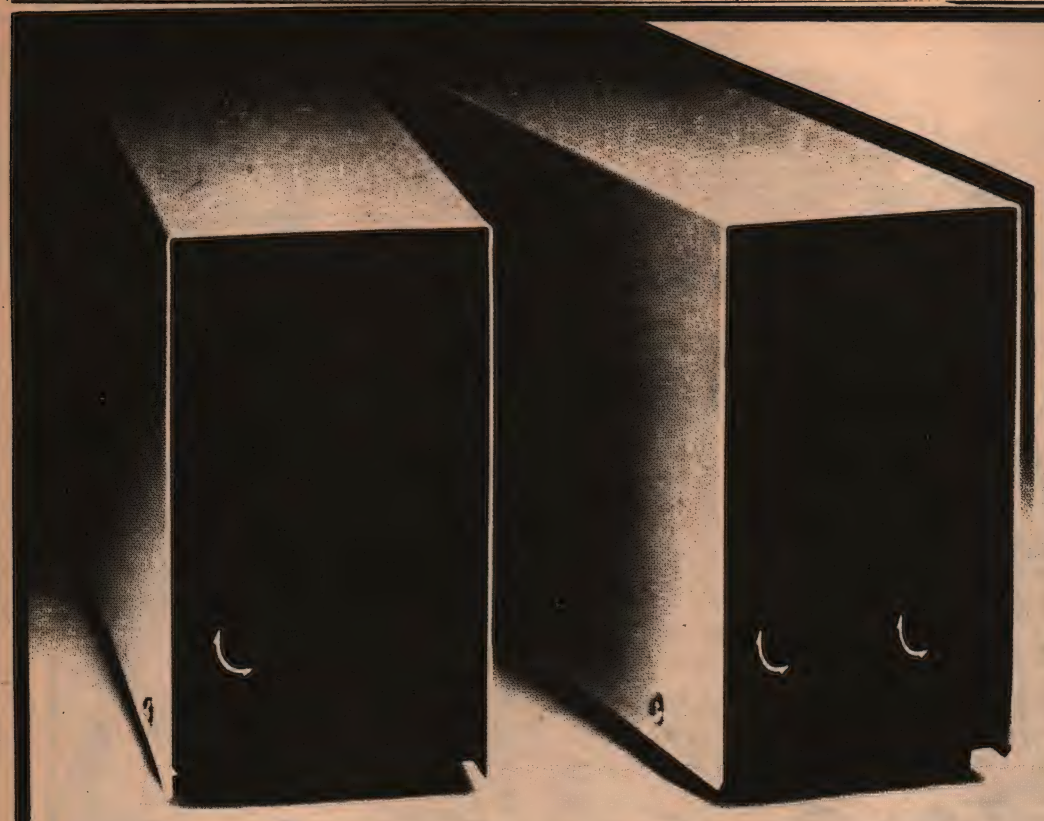

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	Assorted Diskettes		100.00
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Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

JULY

July 19-20, 1986
THE 1986 ATLANTA HAMFESTIVAL, sponsored by the Atlanta Radio Club, will be held in the Georgia World Congress Center. The all-indoor event will feature over 150 exhibitors, Forums on virtually all aspects of Amateur Radio, as well as a huge, air-conditioned flea market. For further information, send a SASE to the Atlanta Hamfestival Inc., P.O. Box 77171, Atlanta, GA 30357.

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SEPTEMBER

September 2-5, 1986
The first annual COMDEX/AUSTRALIA dedicated exclusively to computer industry marketers, independent retailers, distributors and dealers, will be held at RAS Showground in Sydney, Australia. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

September 4-6, 1986
The second KANSAS CITY COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at the Kansas City Convention Center. Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

September 4-6, 1986
The LONG ISLAND COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at the Nassau Coliseum, Long Island, NY. Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

September 11-13, 1986
The ninth TAMPA COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at the Curtis Hixon Convention Center. Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

September 25-27, 1986
The SAN FRANCISCO COMPUTER & EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at Brooks Hall and Civic Center. Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

OCTOBER

October 16-18, 1986
The seventh ATLANTA COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at the Atlanta Civic Center. Geared to business professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

October 27-29, 1986
The first annual INTERFACE INTERNATIONAL in Europe Conference and Exposition will be held at the parc des Expositions in Paris, France. For additional informaton contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

October 30-November 1, 1986
The ninth SOUTH FLORIDA COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an expositon of small computer and business equipment users will be presented at the Miami Expo Center. Geared to business, professional and corporate users of computer systems and business euqipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

NOVEMBER

November 10-14, 1986
The eighth annual COMDEX/Fall, the world's largest computer industry trade show will be held at seven major Las Vegas facilities—Las Vegas Convention Center, the Convention Center's West Hall, the Las Vegas Hilton, Riviera, Sahara, Caesar's Palace, and MGM Grand hotels. For additional information contact The Interface Group, Inc., 300 First Avenue, Needham, MA 02194; (617) 449-6600.

November 20-22, 1986
The sixth LOS ANGLES COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at the Los Angeles Convention Center. Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, Inc., 300 First Avenue, Neeham, MA 02194; (617) 449-6600.

November 20-22, 1986
The sixth CHICAGO COMPUTER & BUSINESS EQUIPMENT SHOWCASE, an exposition for small computer and business equipment users, will be presented at McCormick Place, Geared to business, professional and corporate users of computer systems and business equipment. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

DECEMBER

December 11-13, 1986
The second annual INTERFACE in Japan Conference and Exposition will be held at the Harumi Exhibition Center and Keio Plaza Hotel in Tokyo. More than 150 companies are expected to display and demonstrate computer systems and communications services for large-scale corporate, government and institutional systems users in Japan, Korea, Taiwan (R.O.C.), Singapore, Hong Kong, and the People's Republic of China. For additional information contact The Interface Group, 300 First Avenue, Needham, MA 02194; (617) 449-6600.

Users Groups

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Call or Write: (305)269-3211; P.O. Box F, Titusville, FL 32781

USER GROUPS

The User Groups Section is a regular feature of *Computer Shopper*. This is where you can list your club's address at no charge. User Group listings are in state sequence. If you would like to have your club listed, follow the instructions listed below:

User Group Submission Policy

All User Group entries must be submitted in writing by the first Monday of every month. **Submissions received by the first Monday of July will appear in the September issue.** The listing will be good for three issues thereafter. After this period they will be deleted unless we receive a post card or letter confirming the board is active. It is the responsibility of the person who submitted the listing to mail all corrections, updates, and deletions to *Computer Shopper*. Remember, if you do not let us know when your club is inactive, it will be listed until deleted.

Send all correspondence to:

Computer Shopper
User Groups
P.O. Box F
Titusville, FL 32781.

We are not responsible for errors published in these listings.

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BAMA 99'ERS, P.O. BOX 1307. TUSCALOOSA. AL 35403
BAY AREA IBM PC USERS GROUP C/O STEVE HUGHES. RT. 2. BOX 281-B. FAIRHOPE. AL 36532
BIRMINGHAM APPLE CORPS, PO BOX 55421. BIRMINGHAM. AL 35255
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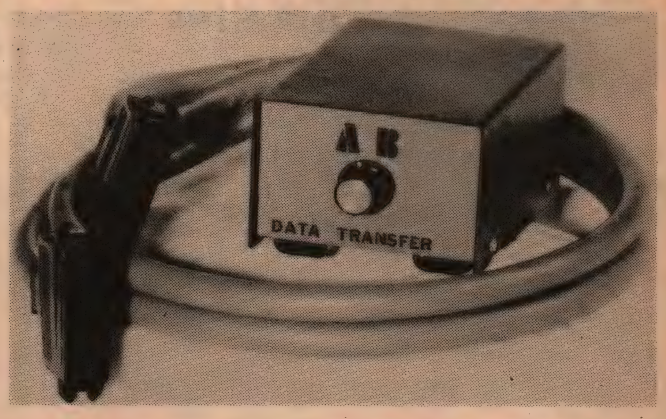

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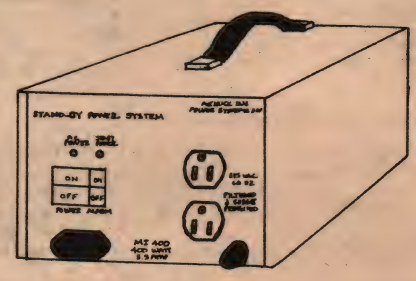

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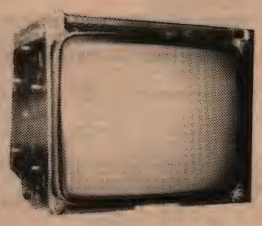

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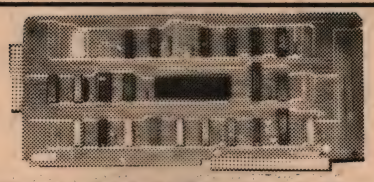

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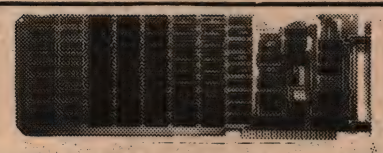

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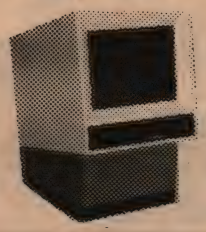

Black & White
Composite Video
110V (Used Good)

$30 ea.
Shipping & Handling $15.00

DTC 510BGI Hard Disk Controller

SASI Controller-Talk to Host via Parallel Port.
Standard Command Structure
Not For Use On A PC

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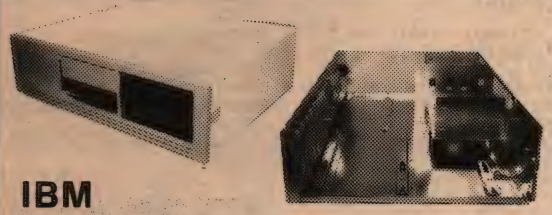

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Top (Powdered Paint-Virtually Indestructible) Bone
Chassis (Fully Punched) 5 I/O Slots
Front Panel
Blank Panels-Full Height of ½ Height (You Specify)
Feet
Input Power Connector
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.Memorex 101 OEM
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SHUGART OEM
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Not designed for use on a PC

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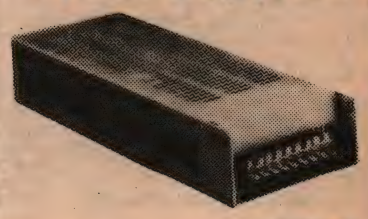
9334	+5.0V 5% To1 2.0A to 8.0A	+12 V 8% To1 0.03A to 0.5A	-12 V 10% To1 0.00A to 0.2A	+24.0V 1% To1 0.5A to 2.0A	$25.00
8799	+5.0V 5% To1 1.0A to 3.0A	+12.0V 10% To1 1.0A to 3.0A	-12.0V 10% To1 0.1A to 0.3A		$25.00
5230	+5.0V 5% To1 4.5A to 18.0A	+12.0V 5% To1 0.1A to 2.5A	-12.0V 5% To1 0.0AA to 0.25A		$35.00
9246	+5.0V 5% To1 3.0A to 7.0A	+12.0V 5% To1 0.75A to 3.0A	-5.0V 10% To1 0.0A to 0.3A	-12.0V 10% To1 0.0A to 0.25 A	$25.00
SPL200	+5 @ 25 AMP	+12V @ 3.5 AMP	-5V @ 1 AMP	-12V @ 1 AMP	$49.95

Switching Power Supplies



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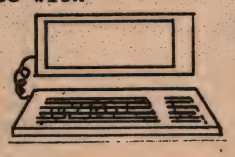

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MONTG. PCUG RBBS, Montgomery, AL 205-264-2278; 2400 baud; 5pm-8am; *24 weekends
TRANS WORLD ATARI, Ozark, AL 205-774-8464; 1200/300 baud *24

ABYSS, Kirkland, WA 206-827-9063; Apple; 300 BAUD
ACCESS NORTHWEST, Vancouver, WA 206-573-7006; IBM; 300/1200/2400 BAUD
ACTION ANNEX, WA 206-892-8969; Atari; 300/1200 BAUD
ALKI EXPRESS, Seattle, WA 206-937-5800; C64; 300 BAUD
ANNEXIAN, Seattle, WA 206-282-9694; C128; 300 BAUD
A.P.P.L.E. CRATE I, Kent, WA 206-872-6789; Apple; 300/1200 BAUD
A.P.P.L.E. CRATE I, (Alternate #) Renton, WA 206-251-0543; Apple; 300/1200 BAUD
A.P.P.L.E. CRATE II, Seattle, WA 206-525-5410; Apple; 300 BAUD; 8pm-8am, *24 on weekends
ARCADIA, Seattle, WA 206-523-6133; C64; 300 BAUD
ARRAKIS, Richmond Beach, WA 206-542-4628; C64; 300 BAUD
A.R.S. (AMATEUR RADIO SUPPLY), Seattle, WA 206-767-3223; C64; 300 BAUD; 6pm-9am
THE ATARI DOGHOUSE, Montesano, WA 206-249-3228
AUTOMAN, Kent, WA 206-854-6336; Atari; 300/1200 BAUD

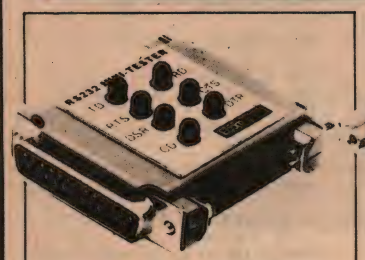
BACK TO THE FUTURE, Seattle, WA 206-281-8674; 300 BAUD
BADLANDS, WA 206-486-1826; 300/1200 BAUD
BAKER STREET, Kent, WA 206-854-0193; Atari; 300 BAUD
B.A.U.D., WA 206-722-1882; Kaypro; 300/1200 BAUD
BBS AT THE END OF THE UNIVERSE, WA 206-820-1700; Atari; 300 BAUD
BELLEVUE CROSSROADS PC-BOARD Bellevue, WA 206-747-1944; 1200/300 baud
BELLEVUE ROS, Bellevue, WA 206-641-4521; Kaypro; 300/1200 BAUD
BLACK MARIAH, Bellevue, WA 206-641-5833; C64; 300 BAUD
BOGUS ZONE, Auburn, WA 206-939-6143; Atari; 300 BAUD; 10pm-6am
BOILER ROOM, Everett, WA 206-347-1008; Atari; 300/1200 BAUD
BONGOLAND, Kent, WA 206-852-8588; 300/1200 BAUD
BRACE BBS, WA 206-644-1144; Atari; 300 BAUD
BUDGET BOARD, Renton, WA 206-271-8613; Atari; 300 BAUD
BUFFALOE BILL'S, Seattle, WA 206-241-5672; Atari; 300/1200 BAUD

CADDY SHACK, Seattle, WA 206-932-8912; C128; 300 BAUD; Closed Sun. to 10
CAMELOT, Bothell, WA 206-487-1992; Atari; 300/1200 BAUD
CAMP CRYSTAL LAKE, Renton, WA 206-271-2211; C64; 300/1200 BAUD
CARTEL, Kent, WA 206-825-3420; LD; 300 BAUD
CBBS/BECS, Renton, WA 206-235-9496; SBC-200; 300/1200 BAUD
CBBS/PUGET SOUND, Kent, WA 206-630-5229; SOL; 300/1200 BAUD
CHALLENGER 51-L, Kirkland, WA 206-827-0346; TRS-1; 300/1200 BAUD
CHAMELEON CIRCUIT, Everson, WA 206-966-4855; Apple; 300/1200 BAUD; 10pm-7:30am
COLOSSUS: DATA DISCOUNT SERVICE, Mercerls, WA 206-236-2566; Compaq; 300/1200 BAUD
COM-SOFT, Everett, WA 206-337-2144; C64; 300 BAUD
COM-SOFT, (Alternate #) Lynnwood, WA 206-742-8422; 300 BAUD
COMMODORE USER GROUP (CUG), Lynnwood, WA 206-743-6021; C64; 300/1200 BAUD
COMMODORE USER GROUP EAST & SOUTH, Seattle, WA 206-364-6497; 300/1200 BAUD
COMPASS, Seattle, WA 206-523-2530; C64; 206-523-2530; 300 BAUD
COMPUTECH INFORMATION SERVICE, Tacoma, WA 206-759-4391; LD; 300 BAUD
COMPUTER EXCHANGE, Seattle, WA 206-431-8664; TRS-1; 300/1200 BAUD

DELTA HOUSE, WA 206-232-1155; Atari
DIAL-YOUR-MATCH –47 Redondo, WA 206-839-3415
DIAL-YOUR-MATCH –220 Kirkland, WA 206-823-5679
DIANE'S PLACE, Bellevue, WA 206-643-9129; C64; 300 BAUD
DOCTOR'S REALM, Seattle, WA 206-364-6268; Atari; 300

L-COM® Shopper's Guide

Products for the ELECTRONIC & COMPUTER Industry

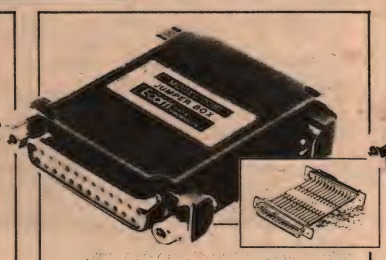


DATA LINE MONITOR

A miniature **DATA LINE MONITOR** allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and dedicated Red LEDs report the status of:

- Transmit Data (TD) pin 2
- Receive Data (RD) pin 3
- Request to Send (RTS) pin 4
- Clear to Send (CTS) pin 5
- Data Set Ready (DSR) pin 6
- Data Carrier Detect (DCD) pin 8
- Data Terminal Ready (DTR) pin 20

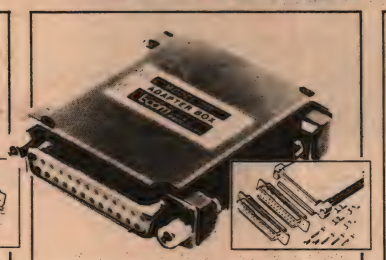
MODEL	CASE MAT'L	1-9	10-24	25-99
DLM	Plastic	29.95	27.25	23.96
DLMS	Metal	32.95	29.98	26.36



RS232 JUMPER BOX

DATA JUMPER BOX Used to customize RS-232 interface devices. All 25 pins of the D-Sub Connectors terminate to 25 solder pads. The PC Board layout makes it easy for you. Supplied with 25 wires already stripped for permanent wiring to suit your needs. Many interfaces could be built, null modems, pin reversers, you name it! Supplied with PC board soldered in place. Your choice of plastic (DJB) or chrome metal (DJBS) snap-on covers. Appropriate hardware is unassembled. Select gender type..

MODEL	GENDER	1-9	10-24	25-99
DJB	M-F	19.75	17.97	15.80
DJBS	M-F	20.85	18.97	16.68
DJBS-F	F-F	20.85	18.97	16.68
DJBS-M	M-M	20.85	18.97	16.68



RS232 ADAPTOR KIT

DO IT YOURSELF KIT - Allows the creation of many types of RS-232 adaptors. The following components are included in the assortment. D-sub connectors have solder cup terminations to accept wire leads.

1 ea. type 25 pin D-Sub connectors, gender depends on model selected.
2 ea. Snap-On halfcovers - UL 94V0 for DIY type, chrome metal for DIYS types.
1 set Hardware for each connector end

MODEL	GENDER	1-9	10-24	25-99
DIY	M-F	9.85	8.96	7.88
DIYS	M-F	11.95	10.87	9.56
DIYS-F	F-F	11.95	10.87	9.56
DIYS-M	M-M	11.95	10.87	9.56

MINI BREAKOUT BOX

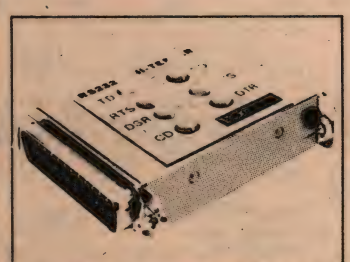
DATA TEST ADAPTOR aids in the design of new interfaces such as printers and terminals. Now it's easy to configure cable connections or signal paths. All 25 pins of each D-Sub connector terminate to individual patch jacks to allow inter-wiring in any pattern. Complete with 25 jumper wires. Metal construction. All pins are identified on label.

MODEL	GENDER	1-9	10-24	25-99
DTAS	M-F	29.95	27.25	23.96

RS232 PROTECTORS

SURGE PROTECTORS guard against voltage spikes entering your RS232 ports. MOVs on crucial lines clamp electrical surges above 26V without affecting operation. Mounts in series, all all lines are wired thru. Surges clamp to pin 1. All metal case construction.

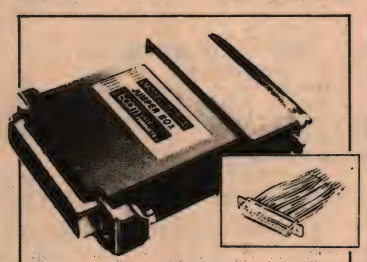
MODEL	LINES	1-9	10-24	25-99
DSPS-3	2, 3, 7	24.95	22.70	19.96
DSPS-4	2, 3, 7, 20	26.95	24.52	21.56
DSPS-5	2, 3, 4, 5, 7	28.95	26.34	23.16
DSPS-5B	2, 3, 4, 7, 20	28.95	26.34	23.16
DSPS-6	2, 3, 4, 5, 7 ,20	30.95	28.16	24.76
DSPS-8	2, 3, 4, 5, 6, 8, 20	34.95	31.80	27.96



DATA LINE MONITOR

New Deluxe Version of our popular **DATA LINE MONITOR** is now available with red and green LEDs to indicate Hi, Low, or Open condition. Chromed metal shell construction.

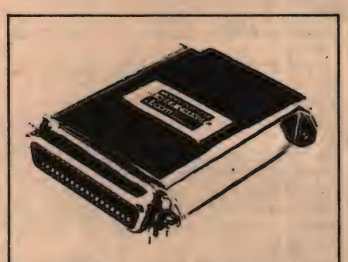
MODEL	GENDER	1-9	10-24	25-99
DLMS-2	M-F	39.95	36.35	31.96



RS232 to CENTRONICS

SERIAL PARALLEL ADAPTOR KIT - Used to customize your own printer adaptors. The D-Sub 25 has 25 flying leads, ready to be soldered to any of the 36 pins on the Centronic connector. DJBA-2 has a female D-Sub & a Male Centronics..

MODEL	GENDER	1-9	10-24	25-99
DJBA	M-M	24.95	22.70	19.96
DJBA-2	F-M	24.95	22.70	19.96



GENDER CHANGER

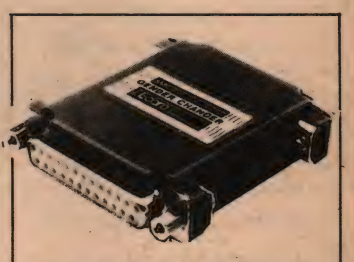
GENDER CHANGER mates Centronic parallel printer cables of the wrong gender. Features an all metal construction. 2 models satisfy all needs. Mating Centronic cable available, ask for details.

MODEL	GENDER	1-9	10-24	25-99
DGS-36F	F-F	29.95	27.25	23.96
DGS-36M	M-M	29.95	27.25	23.96

METAL BREAKOUT BOX

An economical **BREAKOUT BOX** allows easy configuration of the RS-232 interface. Each line of the interface, with the exception of pin 1 can be programmed by 24 independent slide switches. 24 pr. test points also provided on each side of test switch to allow patching and monitoring. Supplied with 10 jumper cables and carry case. Steel construction.

MODEL	GENDER	1-9	10-24	25-99
RS-50	M-F	59.95	54.55	47.96

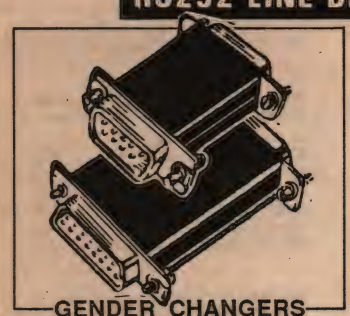


GENDER CHANGERS

GENDER CHANGERS - Are handy devices enabling the mating of wrong sex cables to equipment or to other cables. ABS encased or metalized to offer maximum shielding. Will withstand extensive abuse. Four models fill most requirements. For RS-232 use.

MODEL	GENDER	1-9	10-24	25-99
DG-25F	F-F	16.95	15.42	13.56
DG-25M	M-M	16.95	15.42	13.56
DGS-25F	F-F	17.95	16.33	14.36
DGS-25M	M-M	17.95	16.33	14.36

RS232 LINE DEVICES SAVE TIME & AGGRAVATION



GENDER CHANGERS

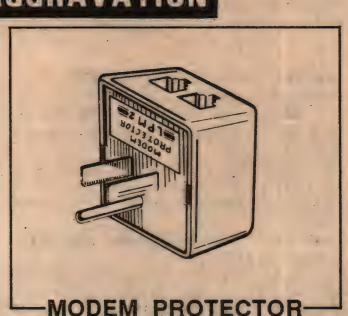
GENDER CHANGERS mate wrong sex cables. Heavy duty insulated metal enclosure to stand wear and tear. Your choice of 9, 15, 25 & 37 pin D-Sub connections. Model number determines type. All in stock for immediate delivery.

MODEL	GENDER	1-9	10-24	25-99
MG-9F	F-F	15.95	14.51	12.76
MG-9M	M-M	15.95	14.51	12.76
MG-15F	F-F	18.95	17.24	15.16
MG-15M	M-M	18.95	17.24	15.16
MG-25F	F-F	23.95	21.79	19.16
MG-25M	M-M	23.95	21.79	19.16
MG-37F	F-F	27.95	25.43	22.36
MG-37M	M-M	27.95	25.43	22.36

COAX ELIMINATOR

These **COAXIAL BALUNS** when used in pairs allow IBM 3270 terminals to be connected over one twisted telephone pair to the IBM 3274 controller. Accepts both RJ11 (Jack) and twisted pair (screws). Transmit data up to 1000 ft. without any signal degradation or change in response time.

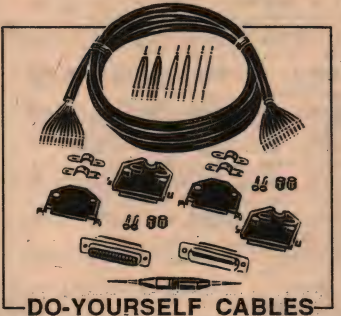
MODEL	BNC	1-9	10-24	25-99
CF-11	Female	44.50	41.83	39.16
CM-11	Male	44.50	41.83	39.16



MODEM PROTECTOR

SURGE SUPPRESSION PROTECTS against lightning and other electrical disturbances. Our 2-stage design provides a sophisticated blend of high speed, gas discharge and voltage limiting in nano seconds. Proper ground is most important & L-com has solved this by making use of your grounded AC outlet. The protector recovers automatically in preparation for next surge.

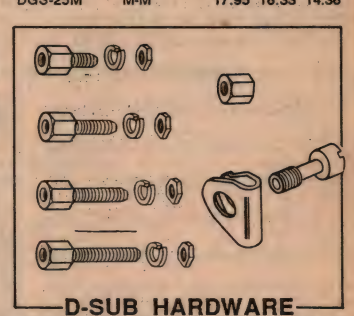
MODEL	1-9	10-24	25-99
LPM-3	34.50	31.05	27.60



DO-YOURSELF CABLES

RS-232 CABLE KITS allow you to create your own Serial data cable. 12 conductor cable terminates to gold plated pins; simply insert into appropriate holes with tool provided. Everything you need is supplied. Please specify gender when ordering. (*) M-M or M-F.

MODEL-FT	(*)Specify	1-9	10-24	25-99
CK25(*)-5	M-M or M-F	13.95	13.25	12.56
CK25(*)-10	M-M or M-F	15.95	15.15	14.36
CK25(*)-15	M-M or M-F	17.95	17.05	16.16
CK25(*)-25	M-M or M-F	21.95	20.85	19.76

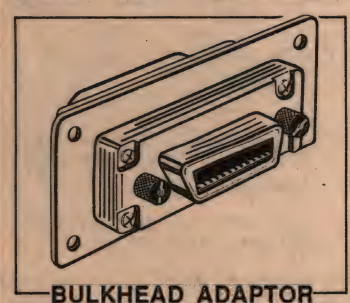


D-SUB HARDWARE

Standard 4-40 **HARDWARE** mates with all D-Subs. Priced at, and sold only in multiples of 50.

MODEL	DESC.	1-9	10-24	25-99
SDG-250	Jack Screw	8.25	8.03	7.44
SDG-300	Jack Screw	8.95	8.50	7.88
SDG-400	Jack Screw	9.45	8.98	8.32
SDG-500	Jack Screw	9.95	9.45	8.76
SDH	Standoff	5.45	5.18	4.80
SDF-1	Screw and Retainer	9.45	8.98	8.32

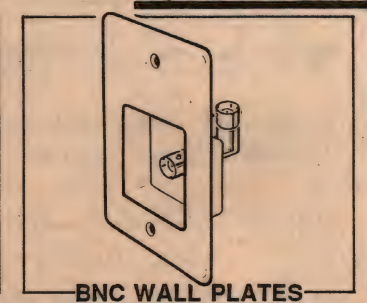
IF YOU DON'T SEE IT We probably have it in stock or we could make it for you.



BULKHEAD ADAPTOR

We're first to offer this **GPIB FEED-THRU ADAPTOR** which allows IEEE-488 cables to pass between panels; All metal construction. We also have a complete line of GPIB cables & accessories available from stock. Ask for details.

MODEL	GENDER	1-9	10-24	25-99
CIB24-BA	M-F	22.52	21.38	20.25



BNC WALL PLATES

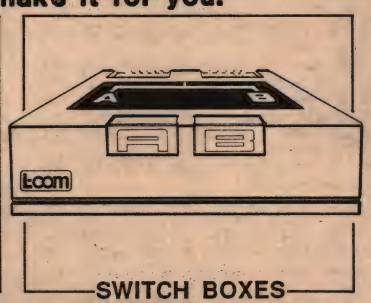
An Ivory **RECESSED WALL PLATE** with a specially designed right angle BNC feed-thru connector. Ideal for narrow partitions. No protrusions when left unused. Brand new product complete with Mounting Bracket.

MODEL	CONNECTOR	1-9	10-24	25-99
WPR102	BNC/BNC	9.95	9.45	8.76

MULTIPLEX CONVERTOR

Simplify **WANG WORK STATION** wiring from troublesome dual coax to a twisted pair telephone wires. Reliable communication between host and terminal up to 600' (42xx) or 900' (22xx). Convertors are maintenance free. Two required, one on each end, BNC & TNC to RJ-11.

MODEL	1-9	10-24	25-99
CW-2	74.00	69.56	65.12



SWITCH BOXES

High quality **TRANSFER SWITCH BOXES** at reasonable prices. High impact case; gold plated self-cleaning switch contacts; Mil-grade PCB; pushbutton action, color matches computer equipment. Choice of RS-232 or Centronics types.

MODEL	TYPE	1-9	10-24	25-99
DU2500	Serial	59.00	56.05	53.10
DU3600	Parallel	79.00	75.05	71.10

FREE!

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Over 1500 **COMPUTER ACCESSORY** products, many are unique to help solve problems. A convenient shoppers guide which provides technical information, comparisons and quantity pricing. Includes coaxial & multi wire data cables, connectors, IEEE-488, switch boxes, patch panels; testers, baluns, surge protectors, etc. Same day shipping of almost every item listed. Call Customer Service today for your FREE copy.

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Bulletin Board

BAUD; 8pm-8am
DOSFILE XL, Seattle. WA 206-367-3453; Atari; 300/1200 BAUD
DOWNSPOUT, Seattle. WA 206-325-1325; Epson; 300/1200/2400 BAUD
DRAGON'S CAVERNS, Richmond Beach. WA 206-542-2757; Atari; 300 BAUD; 10:30pm-8am
ELECTRONIC ANTIOCH, WA 206-443-0629; Appie; 300 BAUD; 8pm-8am weekdays. *24 weekend
ESKIMO NORTH/POLYNET, Seattle. WA 206-367-3837; TRS-16; 300/1200 BAUD
ESP, WA 206-885-1722; C64; 300/1200 BAUD; 10pm-6:30am
EVENT HORIZON, Issaqua. WA 206-392-5829; C64;. 300 BAUD; 9:30am-5:30am
FIDO: BECS TANDY, Seattle. WA 206-527-5618; Tandy 1200; 300/1200 BAUD
FIDO: DATA JOCKEY, Bellevue. WA 206-643-0909; IBM PC; 300/1200 BAUD; 7pm-6am
FIDO: EMERALD CITY, Bothell. WA 206-481-6549; Amer XT; 300/1200 BAUD; 6pm-10am
FIDO: HEATH/ZENITH, DesMoines. WA 206-941-6943; IBM PC; 300/1200 BAUD
FIDO: PTC-NET, Burlington. WA 206-757-5233; 300/1200/2400 BAUD; 5pm-7am; *24 weekends
FIDO: TROUBLE SHOOTER, WA 206-922-0106; Sanyo; 300/1200/2400 BAUD
FIDO: UNDER THE RAINBOW, Bothell. WA 206-485-5320; DEC Rnbw; 300/1200 BAUD; 4:30pm-10pm
FIDO: WATER SHED, WA 206-878-1941; AT&T 6300; 300/1200 BAUD
FOUNDATION AND EMPIRE, Seattle. WA 206-323-1330; Atari; 300/1200 BAUD
FPS TECH-BOARD, Tacoma. WA 206-565-9465; 300/1200 BAUD
FRENCH CONNECTION, Lynnwood. WA 206-775-4447; TRS 2; 300/1200 BAUD
GALACTIC UNIVERSITY, Seattle. WA 206-431-0557; Atari; 300 BAUD
GAS-XE, Lynnwood. WA 206-745-4077; Atari; 300/1200 BAUD
GATEWAY, Silverdal. WA 206-698-1388; LD; 300/1200 BAUD
GNOMES GNOLL, Everett. WA 206-334-0223; LD
THE GREAT NORTHWEST BUYERS BOARD 206-598-3228; 7pm-10pm Monday-Thursday; 7-pm Friday-10pm Sunday; 300 baud
GREAT WHITE NORTH, WA 206-828-9453; Atari; 300 BAUD
HAM NET & ELECTRONICS, Seattle. WA 206-285-3040; C64; 300 BAUD
HARRY'S HIDEAWAY, Renton. WA 206-226-7506; C64; 300 BAUD; 8pm-7am
HEATH USERS' GROUP PERSONAL BBS, Seattle. WA 206-782-1302; H-101; 300 BAUD; 4pm-7pm; *24 weekends
HI-FI T-ROOM, Seattle. WA 206-723-7437; Apple; 300/1200 BAUD
HYBORIAN AE, Seattle. WA 206-522-2508
I.B.S. SYSTEMS: GIG HARBOR BBS, Gig Harbor. WA 206-858-2028; LD; 300 BAUD
I.B.S. SYSTEMS: OUTER LIMITS BBS, Seattle. WA 206-285-3210; C64; 300 BAUD
I.B.S. SYSTEMS: TECH SYSTEM BBS, Bellevue. WA 206-453-0903; C64; 300 BAUD; 10pm-7am
INFORMATION MANAGEMENT SYSTEMS, Tacoma. WA 206-535-2730; Kaypro; 300/1200 BAUD
INFORMER SYSTEMS, Everett. WA 206-337-4078; C64
INVISIBLE SEATTLE, Seattle. WA 206-784-7685; IBM PC; 300/1200 BAUD
JOB SYSTEM, Bothell. WA 206-487-3290; IBM PC; 300/1200 BAUD
J.R.-XCHANGE, Richmond Beach. WA 206-542-8529; TI99; 300/1200 BAUD
JOURNEY TO MARS Bothell. WA 206-486-3136; IBM: 300/1200 baud *24
KNOTHEAD'S NOOK, Kent. WA 206-631-8056; Atari; 300/1200 BAUD
LIFE IN HIS WORD, Tacoma. WA 206-472-9331; LD; 300/1200 BAUD
LORDS OF DARKNESS, Bothell. WA 206-485-0665; C64; 300 BAUD
LORDS OF DARKENESS I, Kirkland. WA 206-821-3387; 300 BAUD
MAC CAVERN BBS, Seattle. WA 206-525-5194; Apple; 300 BAUD
MAPLE HILLS, Renton. WA 206-228-7533; C64; 300 BAUD; 6pm-10pm
MEANING OF LIFE, Kirkland. WA 206-827-9063; LD; 300 BAUD
MICRO MAGIC, Sumner. WA 206-863-1713; LD; 300/1200 BAUD
MINIBIN: KZOK/KJET, Seattle. WA 206-281-5656; TRS-3; 300/1200 BAUD; clsd 7am-11am
MINIBIN: ORBITER, Kent. WA 206-631-4381; LNW; 300/1200 BAUD
MINIBIN: ORBITER (FORWARDING -), Seattle. WA 206-932-2858; 300/1200 BAUD
MINIBIN: SATELITE SYSTEM, Seattle. WA 206-762-5141; TRS-1; 300 BAUD
MINIBIN: TRANQUILITY BASE, Seattle. WA 206-525-0497; TRS-3; 300 BAUD
MINIBIN: CHERYL'S VELVET TOUCH, W. Seattle. WA 206-937-2957; LNW; 300 BAUD
MR. ROGER'S NEIGHBORHOOD, Seattle. WA 206-522-8514; C64; 300 BAUD; 8pm-7am
MULTI PHREAKWENCY, WA 206-742-4280; 300 BAUD
MUSHROOM SHOP, Seattle. WA 206-527-8981; C64; 300 BAUD
NIGHTHAWK BBS, Van. WA 206-694-2852 *24
NORTH STAR T-ROOM RCP/M, WA 206-523-5355; 300/1200 BAUD
NORTHWEST CONNECTION, Seattle. WA 206-935-7530; Apple; 300/1200 BAUD
NORTHWEST MICRONET, Tacoma. WA 206-535-2837; LD; 300/1200 BAUD
OLD CHICAGO, DesMoines. WA 206-838-1815; Atari; 300 BAUD
PC BOARD: UNDERDOG, Seattle. WA 206-725-9233; IBM PC; 300/1200/2400 BAUD
PC BOARD: INFINITY BASE, Seattle. WA 206-329-9260; IBM PC; 300/1200/2400 BAUD
PC MATCH, Seattle. WA 206-935-5416; IBM PC; 300/1200 BAUD
PENITENTIARY, Lynnwood. WA 206-742-6942
PERNET BBS, Seattle. WA 206-782-6669; C64; 300 BAUD; 10pm-3pm
POLYNET PUBLIC SYSTEMS dsPPS, Seattle. WA 206-783-9798; Apple. 300/1200 BAUD
POLYNET PUBLIC SYSTEMS gsPPS, Seattle. WA 206-784-9776; Apple; 300/1200 BAUD
POLYNET PUBLIC SYSTEMS 1sPPS, Lacy. WA 206-438-4477; Apple. 300/1200 BAUD
POLYNET PUBLIC SYSTEMS rsPPS, Seattle. WA 206-784-3217; Apple; 300/1200 BAUD
POLYNET PUBLIC SYSTEMS tsPPS, Seattle. WA 206-784-3218; Apple. 300/1200 BAUD
POWER HOUSE I, Bellevue. WA 206-453-4074; C64; 300 BAUD
PROTOSOFT, Seattle. WA 206-932-7125; IBM PC; 300/1200 BAUD
PUBLIC DOMAIN SILO, Lynnwood. WA 206-775-2650; C128; 300/1200 BAUD; 6pm-12am
PX, Seattle. WA 206-246-9627; C64; 300 BAUD; 6pm-6am
RBBS-PC: AUBURN, Auburn. WA 206-833-4183; IBM PC; 300/1200 BAUD; 6pm-12pm
RBBS-PC: ELECTRONICS SYSTEM, Renton. WA 206-235-8760; ZF-160; 300/1200 BAUD
RBBS-PC: HEPTITE GUILD, Mape Valley. WA 206-432-0650; Tava PC; 300/1200 BAUD
RBBS-PC: IBM-PC-UG, Seattle. WA 206-343-7843; 300/1200 BAUD
RBBS-PC: K.A.U.G., Silverdale. WA 206-692-8274; IBM XT; 300 BAUD; 5:30pm-9:30am
RBBS-PC: NIGHT SHIFT, Bothell. WA 206-488-0924; IBM PC; 300/1200 BAUD
RBBS-PC: PLANET CLAIRE, Seattle. WA 206-783-8037; IBM PC; 300/1200 BAUD; 5pm-10pm
RBBS-PC: PUGET SOUND, Lynnwood. WA 206-743-0162; IBM PC; 300/1200/2400
RBBS-PC: PUGET SOUND (SOUTHEND), Seattle. WA 206-281-7661; 300/1200/2400 BAUD
RBBS-PC: SEARS BUSINESS CENTER, Bellevue. WA 206-641-6265; IBM PC; 300/1200 BAUD
RBBS-PC: SEARS BUS. CNTR (Lynnwood), Lynnwood. WA 206-775-8412; 300/1200 BAUD
RBBS-PC: SEATTLE HOMEDOME, WA 206-946-1627; IBM PC; 300/1200/2400 BAUD
RBBS-PC: SHADOW, Lynnwood. WA 206-775-7409; IBM PC; 300/1200 BAUD
RBBS-PC: TRINITY, WA 206-778-3034; IBM PC; 300/1200 BAUD
REALM OF MOISTURE, Redmond. WA 206-882-9025; Atari; 300/1200 BAUD
REEF, Puyallup. WA 206-848-3371; LD; 300/1200/2400 BAUD
RIVERSIDE BBS, Bothell. WA 206-488-7551; Atari; 300 BAUD
ROUND TABLE II, Bellevue. WA 206-746-0829; TRS-4; 300 BAUD
SCRUNCHLAND, DesMoines. WA 206-824-4013; Atari; 300 BAUD
SEACOM-80, Seattle. WA 206-763-8879; TRS-1; 300/1200 BAUD
SHERWOOD FOREST Tacoma. WA 206-531-6148; 300/1200 baud
SHOOTING STAR, DesMoines. WA 206-838-7686; 300 BAUD
SHUTTLE EXPRESS, Redmond. WA 206-885-4636; 300 BAUD
SIXTY-FOUR EXPRESS, Kent. WA 206-852-9412; C64; 300 BAUD; 9pm-8am
SKYLINE, Seattle. WA 206-367-3697; Atari; 300/1200 BAUD
SKYLINE NORTHEND, (Alternate #) Lynnwood. WA 206-778-1143; 300/1200 BAUD
SOFTWARE SALERS, Seattle. WA 206-367-2026; TRS-3; 300 BAUD; 7pm-9am; *24 weekend
SPANAWAY USER'S GROUP, Tacoma. WA 206-531-0783; C64; 300 BAUD
SPEEDWAY, Seattle. WA 206-367-7509; Atari. 300/1200 BAUD
SS RIPTIDE, WA 206-546-8231; C64; 300 BAUD
SS TRADEWINDS, Tacoma. WA 206-752-2889; 300 BAUD
STALLEG XL, Seattle. WA 206-782-5534; Atari; 300/1200 BAUD
STARFLEET HEADQUARTERS, Seattle. WA 206-783-5589; Apple. 300 BAUD
STONEHENGE 1.21: AMIGA/OS9, WA 206-874-6381; Amiga; 300 BAUD; 5pm-8am
STONEHENGE 1.21: GOLDEN SUB, WA 206-488-0381; IBM PC; 300/1200 BAUD
STONEHENGE 1.21: J.J.'s, WA 206-632-1880; IBM PC 300/1200 BAUD
STONEHENGE 1.21: TWILIGHT ZONE, WA 206-745-2438; IBM PC; 300 BAUD
STONEHENGE 1.21: UNDERWORLD, Normandy Park. WA 206-244-6252; Compaq; 300/1200 BAUD
STONEHENGE 2.02: CKMCMS, Seattle. WA 206-329-0436; IBM PC; 300 BAUD
STONEHENGE 2.02: SANCTUARY, Bellevue. WA 206-747-6839; Compaq; 300/1200 BAUD
STONEHENGE 2.02: T.U.G. BBS (MPC5), Seattle. WA 206-632-0272; IBM PC; 300/1200 BAUD
STONEHENGE 2.02: TUKWILA STATION, Seattle. WA 206-244-0125; IBM PC; 300/1200 BAUD
TACOMA STAR TREE (TTST), Tacoma. WA 206-759-0615; LD; 300/1200 BAUD
TARDIS, Seattle. WA 206-329-2202; Datavue; 300/1200 BAUD; 6pm-8am; *24 weekend
TELECOMMUNICATIONS USERS GROUP Seattle. WA 206-763-3116; 300 baud
TELE-MESSAGE 1, Seattle. WA 206-282-2482; C64; 300 BAUD; 5:30pm-11pm
TELE-MESSAGE 2, Seattle. WA 206-282-2482; Atari; 300 BAUD; 5:30pm-11pm
TELE-MESSAGE 3: COSMIC CONNECTION, Bellevue. WA 206-641-3705; C64; 300 BAUD
TELE-PIRATER64, WA 206-543-8714; 300/1200 BAUD
TELE-TRAVEL, Kirkland. WA 206-823-6091; 300/1200 BAUD
TICOMM, Seattle. WA 206-784-4142; TI99; 300 BAUD; Evenings
TIGERS LAIR, DesMoines. WA 206-874-4115; Apple; 300 BAUD
TOXIC BBS, Kent. WA 206-854-6147; Atari; 300 BAUD
TRIDENT BASE ONE, Bremerton. WA 206-698-2387; Apple; 300 BAUD
TRON, Bothell. WA 206-485-7784; 300 BAUD
UNIX BBS, Yelm. WA 206-458-3086; S-100; 300/1200 BAUD
USPS EXCHANGE, Seattle. WA 206-323-0711; C128; 300 BAUD
VIEWPORT (PAUG), Mercerls. WA 206-236-2246; Amiga; 300/1200 BAUD
WAVE NETWORK: RADIO 1, DesMoines. WA 206-878-0158; C64; 300/1200 BAUD
WAVE NETWORK: RADIO 2, DesMoines. WA 206-941-7649; 300 BAUD
WAVE NETWORK: RADIO 5, DesMoines. WA 206-838-0783; C64; 300 BAUD
WBBS: THE MISSING LINK, North Hill. WA 206-878-1823; Sanyo; 300/1200 BAUD
WHITTLEBIT T-ROOM, Juanita. WA 206-868-2866; Onyx; 300/1200 BAUD
WILD CAT CAT-FUR, Bothell. WA 206-488-9704
XANTH II ST, Bellevue. WA 206-747-9638; 520ST; 300/1200 BAUD
XANTH II ST, (Alternate #) WA 206-682-8039; 520ST; 300/1200 BAUD
XANTH II ST NORTH & SOUTHEND, Seattle. WA 206-328-2755; 520ST; 300/1200 BAUD
128-XCHANGE, Olympia. WA 206-943-4548; C128; 300 BAUD
28 BARBARY LANE, Seattle. WA 206-323-2828; Atari; 300 BAUD
64 E/T, Lynnwood. WA 206-776-0749; C64; 300 BAUD

DIAL-YOUR-MATCH -315 Westbrook. ME 207-854-1365
EERC South Blue Hill. ME 207-374-2203; 6pm to 6am *24 weekends
MID-COAST MAINE BBS North Haven. ME 207-867-2241; 300/1200 baud; Sun-Thur 9pm-9am EDT; Fri-Sat 9pm-NoonEDT
MMOOS, Brunswick. ME 207-725-8456 *24

ANLN Hayden Lake. Idaho 208-772-6134 *24
THE BSU BOOKSTORE Boise. Idaho 208-343-5000

99 BBS, Manteca. CA 209-239-9529; 300/1200 BAUD *24
RCP/M CBBS, Tulare. CA 209-685-0306; 300/1200/2400 BAUD *24
REGION 7 TEC CENTER ELECTRONIC BBS, Modesto. CA 209-571-5085

DIAL-YOUR-MATCH -264 New York City. NY 212-219-1758
DIAL-YOUR-MATCH -286 New York. NY 212-925-6765
OVER WORLD BBS, Fresno. CA 209-222-1057; Atari Only *24

64 SHOP, Los Angeles. CA 213-566-2937; 300 BAUD; *24
64 SHOPPER Downey CA 213-566-2937; 300 BAUD *24
99BBS, La Habra. CA 213-947-7777
COMMODORE MONITOR, South Gate. CA 213-566-2937; 300 BAUD; *24
COMPUTER CONFERENCE, Center. Torrance. CA 213-212-5267
COMPUCENTER 213-320-0222; 300/1200 baud *24
COMTELL, Los Angeles. CA 213-470-2673; 300/1200 BAUD *24
DIAL-YOUR-MATCH -36 Marina Del Rey. CA 213-397-6300
DIAL-YOUR-MATCH -52 Los Angeles. CA 213-225-9279
DIAL-YOUR-MATCH -164 Malibu. CA 213-457-9150
DIAL-YOUR-MATCH -238 Long Beach. CA 213-438-4777
FIDO 102/115 MACHINEDO, San Pebro. CA 213-548-3546; 300/1200/2400 baud
LYNZIE'S MOTHERBOARD, N. Hollywood. CA 213-659-1982 *24
MARINA MATCHUP, Los Angeles. CA 213-390-3239
TE-II 99 BBS Whittier. CA 213-947-7777; 300/1200 baud *24
THE WARGAMES RBBS, Santa Monica. CA 300/1200/2400. 213-393-9777*

ANLN Dallas. TX 214-263-3109 *24
FAST TIMES, Dallas. TX 214-987-1278 *24
TBBS OF TYLER, Tyler. TX 214-566-1374; 300/1200/2400 BAUD: Atari. TRS-80. Kaypro *24
THIEVE'S UNDERGROUND, Dallas. TX 214-357-6446 *24
T.R.A.I.N. BBS, Ennis. TX 214-875-9818; Atari--AMIS Version

A-NET EAGLE'S NET, Philadelphia. PA 215-969-3384
CALTEX -16, Easton. PA 215-258-5235 *24
C.B.M. ONLY, West Lawn. PA 215-678-7691 300 BAUD *24
THE CITADEL, Philadelphia. PA 215-435-7018; 300/1200 BAUD *24
DIAL-YOUR-MATCH -180 Reading. PA 215-372-1726
DIAL-YOUR-MATCH -223 Auburn. PA 215-488-7846
THE EAGLE'S NEST BBS Shillington. PA 215-775-9940; 300 baud *24
LEHIGH VALLEY COMPUTER GROUP RBBS, 215-759-1376; 300/1200/2400 BAUD *24
NITE OWL 1, 215-285-6575; 300/1200 baud; *24
NITE OWL 2, 215-759-7347; 300/1200 baud; *24
NITE OWL 3, 215-266-9723; 300/1200 baud; *24
TECHIE, Easton. PA 215-252-8867; 300/1200 BAUD *24
TI-LINE, Reading. PA 215-929-5348; 300/1200 BAUD *24
TI-TALK Reading. PA 215-372-1154; 300 BAUD *24

AKRON DIGITAL GROUP Akron. OH 216-745-7855 *24
AMHERST, Amherst. OH 216-988-8806
ARCADIA BBS Akron. OH 216-644-1014
ATARI Ohio 216-582-2797
ATARI EXPRESS Akron. OH 216-253-9247
ATARI PRISM Akron. OH 216-867-2422
BBS Computer Applications Poland. OH 216-757-3711
BIG BOARD (CP/M) Akron. OH 216-745-7819
BULLET-80 Chesterland. OH 216-729-2769
CAMELOT ATARI BBS Akron. OH 216-864-7002 *24
CLOUD NINE, 216-650-2989 *24
COMNET-80 Akron. OH 216-645-0827 *24
THE COMMODORE ARCADIA, 216-644-1014. 11pm-9am est.
COMMODORE'S BRIDGE Akron. OH 216-929-1454
COMMODORE CHIP Akron. OH 216-678-5033 *24
COMMODORE CLIPPER Akron. OH 216-928-4123 *24
COMMODORE COMMANDER Akron. OH 216-923-0347
THE COMMODORE CRUSADER, 216-864-8924 *24
COMMODORE EXPRESS Akron. OH 216-253-9247
THE COMMODORE GATEWAY, 216-896-9001 *24
COMMODORE RAINBOW Akron. OH 216-644-5771 *24
COMMODORE REALM Akron. OH 216-666-9463. 10pm-7am est.
THE COMPUTER EXPERIENCE, Cleveland. OH 216-946-9076 *24
COMPU-CENTER, Akron. OH 216-929-4803 *24
COMPUTER EXPERIENCE 216-946-9076 *24
COPLEY ATARI Akron. OH 216-666-8961
THE DARK TOWER Rogers. OH 216-227-3245 *24
DAYSTAR, Akron. OH 216-798-0937
DIAL-YOUR-MATCH -177 Cleveland. OH 216-481-9476
FEDATA BBS, Cleveland. OH 216-476-1151 *24
FIRECOMM Akron. OH 216-666-0306
FIRESTONE PARK ATARI Akron. OH 216-724-7760
THE FOURTH DIMENSION, 216-644-4597 *24
FORUM-80 Cleveland. OH 216-943-2388; 300/1200 baud
THE GOLDEN KEEP, 216-896-9147 *24
HENRIETTA OUTHOUSE,Oberlin. OH 216-965-8151 8pm-7am
MEGA-FORCE BBS Akron. OH 216-699-9055
NEW AGE BBS Cleveland. OH 216-451-3280
NIGHT STALKER Akron. OH 216-376-6443
PIRATES DELIGHT Akron. OH 216-672-7580 *24
PMS Massillon. OH 216-832-8392 *24
PMS RAUG Akron. OH 216-867-7463 *24
RAILNET BBS Cleveland. OH 216-883-6298 *24
RBBS Lorain. OH 216-282-3423
RUBBER CITY ATARI Akron. OH 216-376-7618
S.T.A.R. BBS -1, Akron. OH 216-753-1199 *24
S.T.A.R. BBS -3, Akron. OH 216-753-5379
TBBS of Akron 216-724-2125 *24
TBBS OF SOUTH SUMMIT Akron. OH 216-724-1963 *24
TBBS OF TALLMADGE Akron. OH 216-633-7483 *24
TECHIE Cleveland. OH 216-944-1072
TELETERM 64, Lorain. OH 216-282-8848; 8:00pm-6:00am
TIMEX BULLETIN SERVICE, Parma. OH 216-661-4105
T/P RBBS, New Philadelphia. OH 216-364-3103; 300/1200/2400 baud *24
UNDERGROUND 64 Lorain. OH 216-282-8848 8pm-7am days
VICCOMM Akron. OH 216-896-0775 *24

CCSH-1, Rantoul. IL 217-893-0453; TRS CoCo; 300 baud *24
ICCC RBBS, Mattoon. IL 217-235-2000; 300 BAUD *24
STARNET: ST ATARI NETWORK, 217-267-3530; 300/1200 baud *24
THE INFO SYSTEM, Effingham. IL 217-342-3613; 300/1200 baud; 5:30pm to 8:30am; *24 on Sunday
NETWORK: ATARI, Rantoul. IL 217-892-8889
STARNET (ST ATARI NETWORK), Westville. IL 217-267-3530; 300/1200 BAUD *24

BBS 219-422-9180 *24
DARK CASTLE Warsaw. IN 219-269-5957 *24
FREMONT TOWN CRIER BULLETIN BOARD Fremont. IN 219-495-9747; 3:00pm until 8:00am on weekdays and 24 hours on weekends and holidays

DIAL-YOUR-MATCH -214 Olney. MD 301-774-5776
DIAL-YOUR-MATCH -230 Gaithersburg. MD 301-330-2784
HIDDEN REALM Glen Burnie. MD 301-768-1636; 300/1200 baud; Atari; *24

ATLANTIS, Dover. DE 302-674-0859; Franklin Computer; 6pm-7:30am; *24 weekends
OOP'S DEPT., Dover. DE 19901 302-736-6616; 300/1200 baud; *24
OOP'S DEPT., (Line 2) 302-736-6613; 300/1200 baud; 9pm to 8am
PC-PLAYTIME 302-328-7107 *24
THE WHOLE APPLE Dover. DE 302-734-1766; Apple IIe; 7pm-7am Monday-Friday *24

ATLANTIS BBS Littleton. CO 303-973-0369; 300/1200 baud *24
AURORA-NET, 303-680-9292
AURORA NETWORKS Denver. CO 303-343-8401 *24
COLORADO'S 1ST NOCHANGE!, Fountain. CO 303-382-8326; 300/1200 baud *24
DATA LINK COMPUTER WAREHOUSE Denver. CO 303-934-3693
DIAL-YOUR-MATCH -118 Littleton. CO 303-796-9721
DIVE LINK FIDO 104/610; Denver. CO 303-252-9235 *24
INTRODUCTIONS UNLIMITED Pueblo. CO 303-544-1478; 6 to midnight on weekdays and *24 on weekends
SKYLINE, Northglenn. CO 303-457-0320 *24
VILLA TI, Colorado Springs. CO 303-574-2567; 300/1200 BAUD *24
GRAFIX CONNEXTION, Charleston. WV 304-768-9360; 300/1200 BAUD; Commodore 64 *24

ACES BBS, Ft. Lauderdale. FL; N. Broward/S. Palm Beach access: 305-390-2210 or S. Broward/N. Dade access: 305-431-5189; 300/1200 baud; *24
ADULTS ONLY I TBBS. Miami. FL 305-935-1136 *24
ADULTS ONLY II TBBS. Miami. FL 305-594-4526 *24
ALIEN UFO BBS, Titusville. FL 305-268-3690 *24
ALTERNATIVE UNIVERSE, 305-793-2975; Atari Only
AT-101-ES, Orlando. FL 305-281-0137; Apple
THE ATARI COMPUTER CLUB OF THE PALM BEACHES, 305-585-7879 3pm-8am
BACKSTREETS, 305-937-2838 *24
BBCS PALM BAY, Palm Bay. FL 305-984-7744; 300 baud; Atari *24
BBS, Vero Beach. FL 305-231-6435
CAVE, Hollywood. FL 305-961-8685; 300/1200 BAUD *24
COMM-LINK 99 (TIBBS), Altamonte Springs. FL 305-682-1526; 300/1200 BAUD
DIAL-YOUR-MATCH -81 Sunrise. FL 305-741-5860
DIAL-YOUR-MATCH -250 Delray Beach. FL 305-272-6656
DIAL-YOUR-MATCH -305 N. Palm Beach. FL 305-845-6488
DR. DATA CBBS-RCP/M, Sunrise. FL 305-741-0835; 300/1200 BAUD *24
N.O.R.A.D. Miami. FL 305-633-0636; IBM PC; 300/1200 baud *24
PARTY-LINE, Kissimmee. FL 305-847-2056; Atari *24
PC-RAININODE IV Boca Raton. FL 305-994-3644

THE JAIL BBS Regina. Saskatoon. Canada 306-569-8204; 300/1200 baud *24

THE TRADING POST, East Moline. IL 309-755-6684; 300/1200 BAUD; 8pm-2pm
THE WAR-ZONE BBS, East Peoria. IL 309-699-0901

ANLN Chicago. IL 312-253-9789 *24
The BASIC BBS Aurora. IL 312-896-9628 3pm-11pm; 300/1200 BAUD; TRS-80
CHICAGO SYSLINK, Chicago. IL 312-622-4442; 300/1200 BAUD *24
DIAL-YOUR-MATCH -39 Chicago. IL 312-243-5135
DIAL-YOUR-MATCH -59 Schausburg. IL 312-289-4973
DIAL-YOUR-MATCH -63 Elgin. IL 312-888-3616
DIAL-YOUR-MATCH -70 Lake Villa. IL 312-690-1132
DIAL-YOUR-MATCH -98 Roselle. IL 312-351-1588
DIAL-YOUR-MATCH -102 Riverdale. IL 312-841-6519
DIAL-YOUR-MATCH -110 Chicago. IL 312-256-3995
DIAL-YOUR-MATCH -231 Detroit. MI 312-849-0499
DIAL-YOUR-MATCH -295 Chicago. IL 312-523-4904
EL INFIERNO, Waukegan. IL 312-623-1545; 300/1200 baud *24
LINCOLNET Maywood. IL 312-343-0100
MACROPEDIA BBS, Lake Forest. IL 312-295-6926; 300/1200/2400 BAUD *24
ORGASM! BBS, Chicago. IL 312-772-2452; 300/1200 BAUD *24
SKI'S LODGE, Willowbrook. IL 312-282-9272
SYSLINK Chicago. IL 312-622-4442; 300/1200 BAUD
WILD BILL'S BBS, Chicago. IL 312-873-8360; Commodore 63 *24
YE OLDE ARCHIVE 312-276-4159; IBM-PC & Compatibles; 1200/8/N/1 *24

DIAL-YOUR-MATCH -37 Flint. MI 313-736-1398
DIAL-YOUR-MATCH -231 Detroit. MI 313-849-0499
HIGHWAY 61, Dearborn Hgts. MI 313-274-3206; Apple; 300/1200 BAUD *24
LAKESIDER DATA STATION Grosse Pte.. MI 313-881-7998; 110/300/1200 BAUD TRS-80 *24

DIAL-YOUR-MATCH -279 Clay. NY 315-699-6263

ILION DATA SCIENCE Ilion. NY 315-895-7951 *24
MINI-SYSTEMS Walworth. N.Y. 315-986-5816; 300/1200 baud *24

ATLANTIS, Wichita. Kansas. 316-721-4339
BUSINESS PERSONS' LUNCH Wichita. KS 316-685-1205
C.S.W. 316-942-8746
COMMODORE BBS Wichita. KS 316-683-7848 *24
FORUM-80 Wichita. KS 316-682-2113 *24
GREAT INLAND SEA BBS 316-685-1188 6pm-8am
MOUSE EXCHANGE Wichita. KS 316-685-1190
OMEGA BBS Wichita. KS 316-685-8202
PANTHER I Wichita. KS 316-687-1268
SPECTRUM Wichita. KS 316-945-0882 *24
TIBBS Wichita. KS 316-681-3167
TIBBS Wichita. KS 316-681-3167 *24
UNION STATION BBS Wichita. KS 316-262-0819
W.O.P.A. Wichita. KS 316-683-0160
WOLF'S DEN, 316-838-9456
THE WOODSHED Wichita. KS 316-524-9069

THE ATARI HABIT BBS, Indianapolis. IN 317-899-1878 *24
BIBLE BULLETIN BOARD, Galveston. IN 317-452-1535; 300/1200/2400 baud *24
C*H*U*G BBS, Greenfield. IN 317-898-5027; 1200/300 baud *24
FOUNDATION'S EDGE, Muncie. IN 317-759-8258
THE FRAT HOUSE Marion. IN 317-664-8313
THE MUNCIE TOWN CRIER Muncie. IN 317-759-6893 *24
THE TELETRON NETWORK, Crawfordsville. IN 317-866-1527

BAYOU TIBBS Lake Charles. LA 318-474-6144 *24
DRAGON'S DEN Shreveport. LA 318-687-4648; C-64 *24
POWERSTATION, Shreveport. LA 318-798-1399; C-64 *24
THE TOWNE CRIER BBS, Church Point. LA 318-684-3244 9pm-6am

COMPUCENTER IOWA 319-338-2750 300/1200 Baud Upload/Download
DICK DAVIN REALTY Iowa City. IA 319-338-3947; 300/1200 BAUD *24

NARRAGANSETT BAY ROS Newport. RI 401-683-9115; 300/1200 baud *24
NCCBBS I RI 401-847-8934 *24
PROTOTYPE -1 401-568-4163
PROTOTYPE -2:DRAG-NET 401-568-2343
PROTOTYPE -5:THE STAIRWAY 401-568-4164
THE SHORE BBS, Wyoming. RI 401-364-9788 *24
SYSLINK Providence. RI 401-272-1138; 300/1200 baud *24

DIAL-YOUR-MATCH -114 Omaha. NE 402-734-4748
DIAL-YOUR-MATCH -116 Omaha. NE 402-556-4241
DIAL-YOUR-MATCH -326 Lincoln. NE 402-477-0293

CHETA COMMAND BASE Augusta. GA 404-860-1135 *24
COMPUTER CORNER INFORMATION SERVICE La Grange. GA 404-883-7038 6pm until 10am daily
NOCHANGE Roswell. GA 404-396-2517; 300/1200/2400 baud;*24
R.B.B.S. SYSTEM Atlanta. GA 404-934-1983
TBBS THE COLUMBUS CONNECTON; Columbus. GA 404-687-7309
TRI-STAR, Marietta. GA 404-587-2384

COCONET BBS, Midwest City. OK 405-376-1494 *24
DUCKNET, Lawton. OK 405-355-9678; 10pm-4pm Daily
THE LAND OF MACINTOSH Ada. OK 405-436-1792; 300/1200 BAUD

LAKEVIEW BBS, Billings. MT 406-252-8586
MON-DAK BBS Sidney. MT 406-482-7048

DIAL-YOUR-MATCH -56 Sunnyvale. CA 408-736-7356
DIAL-YOUR-MATCH -268 Sunnyvale. CA 408-733-6266
DIAL-YOUR-MATCH -296 Sunnyvale. CA 408-720-0724
THE JAIL HOUSE Carmel Valley. CA 408-659-3373; 300 baud *24

ASTRAL RIFT BBS, Conroe. TX 409-273-5128; 300/1200 BAUD *24
SILVER STREAK, Vidor. TX 409-768-1444; Apple BBS/AE; *24

PENN-COMM BBS, Uniontown. PA 412-437-8286 *24
PITTSBURGH ATARI COMPUTER ENTHUSIASTS BBS, Pittsburgh. PA 412-963-1355; 300/1200 BAUD *24
PUBLIC DOMAIN WAREHOUSE 412-364-6452; 300/1200 BAUD *24
USER COMMUNICATION SYSTEM/IBM-PC, Pittsburgh. PA 412-276-1269; 300/1200 BAUD *24

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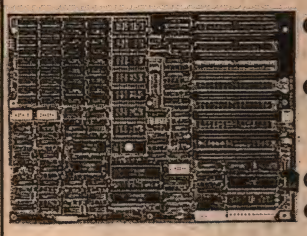

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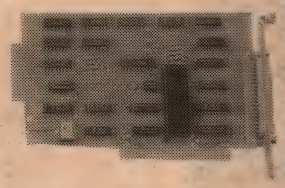

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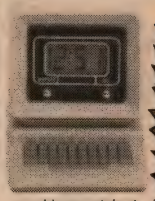

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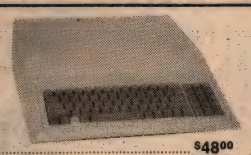

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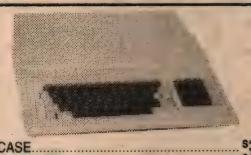

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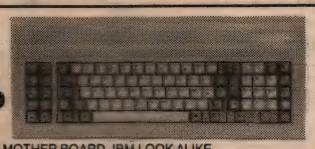

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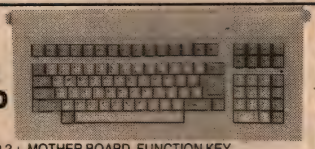

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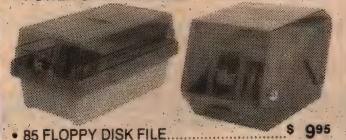

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CASES

XT-Flip Top or Slide $27
AT Slide $72
XT/AT $50

EXPANSION CARDS

Multi I/O $71
AT I/O $55
384K Multifunction Card $71
Disk Controller $25
Monochrome Graphics W/Printer $70
Monochrome Printer $41
Color Graphics $44
Color Graphics with Printer $55
Game Adapter $15

OTHERS

Internal Modem $126
Storage case (100's) $7
Storage case (50's) $5
Speaker $1
Mini Center $40
Keyboard Drawer $30

CLASSIFIED

CLASSIFIED INFORMATION

The classifieds are for **Pre-Owned Items & Software ONLY.** New equipment, Services, etc. must use regular Display space.

Instructions

In order for us to keep the ad rate low and insure accuracy, it is necessary that the following procedures are followed.
1. Type or print your ad legibly on a plain sheet of paper. Ads received that are difficult to read will be returned.
2. Write the desired category at the top of each ad. Please refer to the index, this page, if a category is not indicated, ad will be placed in the Miscellaneous section.
3. If more than one ad is submitted, use a separate piece of paper for each ad, making sure your complete name and address is at the bottom of each ad.

CLOSING DATE — 2nd Monday of the month. Example: Ads received by the 2nd Monday of August will appear in the October issue. **Due to our low rates, you cannot change, cancel or receive a refund on classifieds after they are typeset.** In most cases, ads are typeset within a week after they are received.

RATES

Subscribers: 25 cents per word. $5.00 per ad minimum charge. The first two words (if underlined) will be set in bold face at no additional charge. Bold face or all cap words thereafter will be fifty (50) cents per word. Special bold headings, partial lines, open space or leader dots are:
1 line of leader dots with price, $1.25 per line
6.5 point line, $1.25
10 point bold line, $2.00
Maximum of 15 characters per line
Non-subscriber rates are double all rates listed above.

REPEAT ADS

Ads running more than one time. A repeat ad will be coded at the end of the ad with month the ad started and issue ad ends. Example: 8-160. Ad started Aug. ends 160 issue or January. NOTE: Please check to make sure your ad has been correctly coded.

PROOFS

Due to low classified rates a free checking copy or tear sheet cannot be sent if proof of insertion is desired, please send $3.00 extra.

PHOTOS

A photo will draw attention to your ad. Photos are $7.00 per column inch. Please send in B/W photos, preferable 4x5's cropped horizontally. Include your name and address on the back of **each** photo. If photo looks like it is more than one inch send in money for two inches or more.

STARS

Have a special piece of equipment to sell? Reducing the price of an item and want to attract attention to that fact? Take advantage of our low price "star" attention getters.

It's a fact...unusual "artwork" in or above an ad draws attention to that ad and the reader retains interest in that product longer.

Get Response Quicker with "Stars" above your ad. Above is the rate for different sizes. Just mark "stars" and the price of the one you choose above your ad copy and we'll take care of the rest. Be sure to include the cost with your ad payment.

CS-ABREVIATIONS

add-post ..... add postage
add-post-AP ... add postage, all prices
FC ..... Freight Collect
MBG ..... money back guarantee
PP ..... postage paid
SASE ..... send self-addressed stamped evelope for check return or information requested
10 DRP ..... 10 day return privilege
CCR ..... check clearance required

EXAMPLES OF STYLES:

Normal

PDP 11/03 COMPUTER
Complete **OPERATING SYSTEM** with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at:
11/03 Computer $900
Dual RZ-1 disc $1,000
32KB memory $2,800

PDP 11/03 COMPUTER. Complete operating system with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000 or separate at: 11/03 Computer $900, Dual RX-1 disk $1,000. 32KB memory $2,800. VT-52 video $1,500, GE Terminet 30 printer $800. Intertube video terminal $400. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

10 Point Centered Head

PDP 11/03 COMPUTER

Complete **OPERATING SYSTEM** with RT-11 system software plus basic. **Joe Doe,** POB 1234, Somewhere, USA 00000, 123-456-7890.

Leader Dots

Intertube video terminal $400
Joe Doe, POB 1234, Somewhere, USA 00000. 123-456-7890.

ATTENTION CLASSIFIED ADVERTISERS

The Classified Ad rates for *Computer Shopper* are now 25 cents per word for subscribers and 50 cents per word for non-subscribers, with a $5 minimum. These rates have been in force since the June issue. However, we have accepted orders at the previous rates, because they were sent prior to notification of rate change. This is the last issue we have accepted ads at previous rates. Starting with the September issue any ads received with incorrect payment will be refused and payment returned.

IMPORTANT NOTICE

Copyright laws pertaining to software can be enforced. Due to the complexity of determining what software is legal or illegal, any and all liability for copyright violations shall rest solely upon the advertiser. Patch Publishing and its staff do not in any way condone or knowingly participate in any such illegal activity.

(101) TANDY COMPUTERS FOR SALE

Arcade Masters! Figure eight auto racing challenges you. Maximum skill required! $5/disk ppd. 10XE/x4800/400 computers 48K No Basic. **Rascom,** 21228 newkirk Avenue, Carson, CA 90745. 8-82

Are We CRAZY or What Sale

IIe extended 80 col. $36
II+/IIe parallel interface $40
II+/IIe serial Bd $45
Disk II controllers ..... Call
IIc drive adapter $15
16k Language Bd. $35
5 Amp power supply $45
II+ 80 column Bd. $45
Disk Drives ..... Call
IIe Keyboards $45
Disk II cases $12
IIc parallel interface $60
IIe CPU $500
II+ CPU $275
Lazer 128 ..... Call
Color monitor NEW $145
Monochrome ..... $65 up
Shreve Systems, 318-865-6743 4-9pm CST, 845 Lark Ave., Shreveport, LA. 71105. COD-VISA/Mastercard accepted. 7-79

BUY/SELL USED COMPUTERS

Quick/Easy/Best value • Thousands of items • For sale by owners • National Listing Service • No Commission • Only $29.95 to list until sold!

1-800-TECTRAN

800-832-8726
VISA/MC Accepted • 401-467-8888
6-79

Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

Complete Portable and desktop system! Model 4 3DD (one external) 64k, printer interface selector, DWP210 and DMP120 printers. modem I. 32K model 100. $1650 + shipping. **Steve Pecoraro,** 5409 Gridley Way, Riverside, CA. 92505. **714-963-7740.**

LNW-80 Mod. 1 handles TRSDOS O/S **factory certified operational** MPI SDDS drive, 80-7 keyboard monochrome monitor factory case. **707-428-1195** eves. Will deal $580.7-80

$$$$ We have a limited selection of Model I's, II's, III's, IV's, 12's, 2000. We give a full 90 day warranty. BUY—SELL—TRADE. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 8-90.

Model 100, like new, 32k memory, Printer cable, Model cable, A.C. adapter, some software $375; Money order or C.O.D. cash. **Brian McGregor,** 1300 Suwanee Rd., Daytona Beach, FL 32014. **904-258-0348** 8-80.

Model 12, 12 MB disk, two floppies, Best Offer. **Steve Gilliland 316-442-0500.**

Model 16B 2-drive 15Meg harddisk, 768k Xenix Multi-User, Software development system, Cobol, Unify, Scripsit-16, $5500 or offer. **414-259-1657, Glenn Klein,** 7215 W. National Ave., West Allis, WI 53214. 7-79

Model one 64k Remapable for CP/M 2 flippy drives, non-buffered EI. Tons of software and lots of goodies. SASE for more. POB 509, Marianna, FL 32446 or **305-677-6141.** $600.

Models 12 & 4P Like new, $1200/$800, 2 drives per system + manuals. Model II keyboard $50. **516-599-5745.** 6-81

Power Supply Repair. TRS80 all models. $30 (including parts). If too badly blown or I can't fix, I'll return payment and supply within 1 week. Send payment with power supply, include return address and Phone #. **Orlando IDE,** 1046 W. Iowa Ave., #2, Sunnyvale, CA 94086. 7-80

CLASSIFIED ORDER FORM

Classified Dept., COMPUTER SHOPPER
P.O. Box F, Titusville, FL 32781

To figure cost of ad, the rate is 25 cents per word for subscribers and 50 cents per word for non-subscribers (50 cents per word bold face) $5.00 per ad minimum charge.

Run under heading # _____
See Index This Page
(Please type or print)

INCLUDE 25-CENTS PER WORD FOR YOUR NAME AND ADDRESS

Name _____

Address _____

City _____

State _____ Zip _____

INCLUDE 25 CENTS PER WORD FOR YOUR NAME AND ADDRESS FOR SUBSCRIBERS AND 50 CENTS PER WORD FOR NON-SUBSCRIBERS.

(For additional words, use separate sheet of paper)

Remittance for $_____ is enclosed.
You may run my ad _____ issues.

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TRS100 32k dc, printer, modem, tape, cables, bar code wand with software manuals and case $400. Accept /MO, MC, VISA. **Gary Linwood,** 6 Newbrook, Newark, DE 19711. **302-738-5794.**

TRS-80 16/6000 Upgrade, 1 Meg RAM, 2 drives, Lineprinter 6, Modem II, Xenix multiuser, Trsdos 4.2, Scripsit, Profile+, Multiplan, Visicalc, and Accounts Payable. System is excellent condition. $1750. **Melvin Neufeld,** Rt. 1, Ingalls, KS 67853. Call **316-335-5316.** 8-80

TRS80 Color Computer II w/books, w/cables $75; Cameo Hard Disk Controller w/cables for Radio Shack $145. **405-360-8938.**

TRUE PORTABLE SYSTEM—Use anywhere—32K Model 100 "NOTEBOOK" computer; w/"Super ROM" integrated WP/SS/DB/OL ROMware; Chipmunk 360K portable diskdrive; ARMS backup battery; casette; cables; extra software/disks; all fits shoudler bag - 8 lb.; less than 50% new price - $800 + shpg. **215-582-2639.** 8-81

Tandy and LNW80 items, hard to find manuals, hardware, software, drives. All must go! No reasonable trade or offer refused. Call **216-259-2635** eves. Ask for **Lou.**

(102) TANDY COMPUTERS WANTED

$$$$ I BUY, Sell, & trade TRS-80's for cash. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 8-90.

WANTED: Disc drive #26-3129 for TRS-80 64K color computer. Send descrip. and price wanted. Will answer all responses. **McClellan,** 1504 Walnut Ridge, Pottstown, PA 19464.

Wanted: 1-4 "Split Arrow" keyboards for Model 4, or will exchange "Cluster Arrow" keyboards. **Robert Johnson,** 5890 Michillinda Road, Whitehall, MI 49461. **616-726-4484.** 7-79

Wanted: Old computers. See section 188. **David Larsen** for details. 7-89

(103) TANDY SOFTWARE, PERIPHERAL

384K for your Tandy 1000. Memory expansion board for 256K RAM (#25-1004) and 128K RAM upgrade kit (#26-5162). Like new $275 for both. **John Albright 213-433-4937.**

68000 Motorola

6MHz/CPU boards populated and tested. Upgrade II/12 to Model-16 $39.95 ea. plus $2 ea. shipping. **John Peeples,** PO Box 9703, Charleston, SC 29411, **803-553-6117.** 7-79

Character Generator for Model III or IV. These character generators double the number of displayable characters. Absolutely no hardware modification is necessary - simply pull out your old chip, and put the new one in. $20 gets you the chip and complete installation and operating instructions. Specify script or scientific set or send SASE for more info. Custom character sets can be arranged. **CPU International,** 11604 Starlight Ave., Whittier, CA 90604. 6-80.

Closeout GE Data Recorder #5158 while they last $19.95. Credit cards **1-216-399-5463. Youngtree,** PO Box 197, Levittsburg, OH 44430.

★ ★ ★

Color Computer programs for only 50¢ each! Many Machine language! Send $5 for 10 programs on tape or disk or write for free catalog. **Coco Software,** PO Box 256-C, Holland, MI 49423. **616-396-7577.** 5-79

EPROM Programmer for Model I, III, or IV. Electronics enthusiasts: Build this system for a fraction of the cost of commercially available programmers. Programs the 2716 thru 27512, 2732A, 2764A, 27128A, 2532, 2564, and 2816A. This system uses the new fast programming algorithms for EPROMs larger than 4K bytes for better speed and reliability. Send $15 to get schematics, theory of operation, construction details, and disk with software to run the system or send an SASE for more info. Also ask about our new 12-bit data aquisition systems capable of 100KHz sampling. **CPU International,** 11604 Starlight Ave., Whittier, CA 90604. 7-81

Earn $1100 per Month with your TRS-80, Apple, Commodore or IBM compatible. This program will allow you to enjoy a handsome full or part-time income working in your own home and setting your own hours. This unique program has been tested and used for over **seven** years and its service has had phenomenal acceptance. We provide all the know-how, the consultation service, and all the materials needed to make this unusual business opportunity a success from the first day. If you like the idea of operating a highly profitable business out of your own home, if you like working with a computer, and if you like making money, then this could be the opportunity you have been searching for. All you need is your TRS-80, Model I, III, IV or 1000, Apple or Commodore computer with or without disk drives, a minimum of 16k memory, a reliable printer, and the desire to turn your micro into a highly profitable home business enterprise. For complete details, send $10 (VISA, MASTERCARD and **AMERICAN EXPRESS** honored) to: **Viking, Inc.,** 910 Soo Blvd., Rice Lake, WI 54868. Ask for "OPPORTUNITY 86"

FREE PROGRAMS!!
TRS80-Coco/TRS80-III/TRS80-4/TRS80-100/TRS80-200/TRS80-MC10/TRS80-PC3/Apples /Commodores/IBMpc's. Send stamps! **EZRAEZRA,** Box 5222-PRJL, San Diego, CA 92105.

★ ★ ★

Get Rich with your micro computer! learn how to cash in on this billion dollar industry. For free details write: **Premiere Books,** 5798 Fenwood Ct., Mentor, OH 44060. 6-82

High Resolution for your TRS-80. Electronic builders: Don't pay Radio Shack for high resolution when you can build it yourself for less than $30. Model I resolution is 384x192. Model III/IV resolution is 512x192. Complete schematics, theory of operation and construction details for $15. Easy to build and install. Comes with software for point set/reset/test, line and circle routines and more. **CPU International,** 11604 Starlight Ave., Whittier, CA 90604. 6-80

LOAN AMORTIZATION SCHEDULE-Bank approved, satisfaction guaranteed. Model's I, III, 4, CC, and MSDOS computers. SASE for sample printout and details. **Computer Services,** Rt. 3, Box 710, Homosassa, FL 32646. 5-79

The Probability Lottery program. Select numbers weighted towards the most or least picked or random. Pick 3&4 too. See reviews in Rainbow Magazine (October 85) or *Computer Shopper Magazine* (January 86). versions for TRS-80 color ecb, 16K tape and 32k disk, and model ¾ disk. Only $19.95. **Gary Olander,** 322 Haymarket Pl, Gahanna, Ohio 43230. 6-80

Lots hardwares/Softwares Information on BBS#201-297-7399 (300/1200 Baud)(24 Hr./Day) (Everyday).

★ ★ ★

MODEL 100/200 EXPANSION MODULES

8K RAM (Model 100) . . . . . Qty. 3 = $18 ea.
24K RAM (Model 200) . . . . . = $59 ea.
NODE COMPUTER SYSTEMS 916-265-4668
408 Broad Street, Nevada City, CA 95959. 8-80

MODEL 100

Navigation for aircraft or boats. Calculates drift angles, ground speed, compass corrections and positions from sun and stars. Includes star finder and identification of observed stars together with detailed user instructions. Complete package (cassette & user instructions) $39.95 postpaid. User Instructions (credited against purchase) $5 postpaid. (FL residents include sales tax) **Simmons Software Inc.,** Box 424, Titusville, FL 32780.

"Masonic Lodge Programs maintain database of members, post dues payments, create name and address rosters or merge files for "SuperSCRIPSIT", and more. Model III version for five DOSes; Model 4/4P version uses TRSDOS 6.2.x $65 includes 28 page manual, postage, and disk. Specify DOS: **John M. Taylor,** 106 Busch Hill Dr., Wetumpka, AL 36092. 4-82

Model 100/200- send for free catalog of compact affordable software. **CSA Software,** PO Box 22261, Chattanooga, TN 37422. 6-84

PROFILE III PLUS SUPERFORMS. Print up to 99 fields on 99 lines from each record. Print record number, system date or literals. Use with floppy or hard disk. On diskette with user's guide. $49.95. **ROY SCHOELLER,** 500 Northpointe Pkwy., #313, Jackson, MS 39211. **Phone 601-956-9798.** 3-79

Printer Equipment and Keyboard. 26-1441A Tractor for 2100 Printer. 26-1440 Sheet feeder (Swiss made for Radio Shack) for 2100 Printer. Keyboard for Tandy 6000. Items never used. Best offer. **Bill Spain,** 5417 Caldwell Mill Road, Birmingham, AL 35243. **205-991-7428.** 7-79

★ ★ ★

Public Domain & User Supported Software tested on Tandy 1000. 50¢ for catalog or $5 for listing on disk. **H-D Enterprises,** Box 1352, Gallup, NM 87301. 7-79

Public Domain Programs 15+ programs per disk. Business-13 disks, ed-9 disks, Communications 2-disks, utilities-16 disks, games-35 disks, total 75 disks = 1125+ programs all model 3...Also 30 model 4 disks. For information write **JaRICK SOFT,** Box 183, Fairmont, MN 56031-0183. 8-82

Software, TRS-80, Model 3 & 4, game, word processing, payroll, accounts payable, screen designer, mailing list, conversion program. **Huntley Enterprises,** 286 Eureka St., San Francisco, CA 94114-2437. 6-79

Survey-Boundary TRS-80/100 24k basic $29.95. Description $1. **P. Billings,** 12134 Bonnie Terr. Dept. CSD, Seminole, FL 33542. 6-82

TRS-80 I/III/4 Mailing List programs. Set of 10 programs. Sort, merge, purge, auto coding, etc. Used in our mailorder operation. Prints labels by Carrier Route, Zip, etc. $24.95 total! **1-800-882-8799, Andy H. Weaver Co.,** W. Farmington, OH 44491. 4-79

TRS-80 MOD I/III/4 Mailorder programs. Used in our day by day operation. Generate invoices, reports, maintain inventory, statements, etc., automatically- We wrote it - we use it! Ten programs total! Only $29.95 TOTAL. VISA, MC. **1-800-882-8799, Andy H. Weaver Co.,** W. Farmington, OH 44491. 4-79

TRS-80 software, models 1/3/4/4P, many useful programs, economical prices. Send $1 for listing: **Practical Programs,** 1104 Aspen Drive, Toms River, NJ 08753. 8-84

BODEX CORP.

224 East Main St. Marlboro Mass. 01752 Phone: 1-617-485-5115

HOURS: M-F 10-9 P.M.
SAT. 10-5 P.M.

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VM-1 Monochrome ...$169

1 DISK 1.2 MEG 512K
$1949.00

20 MEG HD 512K
$2669.00

Monochrome Display Adapter $199.00
ColorGraphics Adapter $249.00
We Have All Accessories

TANDY 1000

$659.00

Intérnal Seagate 20 MEG HD
For Tandy 1000 $599 With Controller

Combination Specials
Tandy 100 with um-4 .....$769.00
with cm-10 .....$1099.00
with cm-4 .....$859.00

Sale Thru 5/30/86
Memory Plus Board $199.00

256 K Board $149.00
2nd Disk Drive $109.00

CM-4 Monitor Color $199.00
CM-10 Monitor Hi-RES Color $376.00
UM-4 Monitor Monochrome $110.00

Zuckerboard For Tandy 1000
640 K Memory Board $159.00
Add clock/calendar $39.00

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192P $379.00
193P $570.00

GEMINI PRINTERS

SG10 .....$239.00
SG15 .....$379.00

ALL TANDY PRINTERS ALSO

DMP 510 .....$649.00
DMP 220 .....$369.00
DMP 2100 .....$849.00

Tandy 1200 HD $1695.00
Monochrome Monitor $186.00
Monitor Card $219.00
MS DOS $79.00

MODEL 100
24K $339.00
Sale Ends 4/31/86

MODEL 200
24K $629.00

ALL PRICES CASH
ALL PRICES ARE SUBJECT TO CHANGE
TRS 80 is a trademark of Tandy Corporation

TELEVIDEO 806 CASES
NEW $129.00

New Cases with latest Rev. Power Supply (the new linear version) with all cables and wiring harness.

Latest Rev. 806 PCB's, new, tested, (when purchased with case) **$350**
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Hard Disk Drives TM603S-10Mb **$225**
Rodine 203-20Mb **$449**
As Is Logic & H.D. Controller PCB's, (when purchased with case), Ea. **$5**

Ask About Package Deal

TELEVIDEO

Cases, PCBs, Power Supplies, Manuals, Hard Drives, Controller Cards, CRT's, Accessories, Special Chips, Video Modules.

8 BIT — Z80 CPU
TS800, 802, 803, 806, 816 & TPC-I

These are Z80A based single board computers with all TTL, crystal OSC, sockets and connectors in place. They support CP/M and/or MmmOST and interface to 1 or 2 floppies and/or a hard disk drive depending on the board. They require the Z80A family of chips plus a 1793, 2143, 1691, and 8-4164's (16 for the 816). In addition the 800, 802 and 803 require a 6545 CRT Controller. The 806 and 816 are multi-user computers and will support 6 (806) or 16 (816) user stations. The 803 and 816 both support 128K of RAM. The 803 has 64K already soldered in place. The 801, 806 and 816 all require RS232 type terminals. The TPCI is the portable version of the 803. The TS800 is the work station for the TS806.

TS 800 KIT & PARTS
Case (PS, Video Module, CRT & Keyboard) **$349**
PCB **$299**
Case & PCB Combo & all doc's **$549**
TS800A (complete) **$499**

TS 802 KIT & PARTS
Case (PS, Video Module, CRT & Keyboard) **$249**
PCB **$349**
Case & PCB Combo & all doc's **$549**

TS 803 KIT & PARTS
Case (PS, Video Module, CRT & Keyboard) **$399**
PCB **$299**
Case & PCB Combo & all doc's **$599**

TS 806 KIT & PARTS
Case (PS, all hardware, all cables, ½h DSDD Flop.) **$275**
PCB Rev. D ..... **$375** **Rev. C** **$350**
Case & PCB Combo & All docs. (includes telefast man.) **$649**
TS806 Complete + 10 Mb HD & Controller PCB **$998**
TS806 Complete + 20 Mb HD & Controller PCB **$1247**
TS800 Work Stations with above package ..... **$499, 3/$1350**

TS816 KIT & PARTS
Case (PS, all hardware, cables) **$275**
PCB **$350**
Case & PCB Combo & all docs. (no tape drive) **$599**
40 Mb, 8" Quantum HP & Controller PCB **$999**
Case & PCB & Hard Drive & Controller **$1499**

TS802 — TS802H UPGRADE KIT
10 Mb Hard Drive, controller card, Prom & Docs. **$399**
20 Mb Hard Drive, controller card, Prom & docs. **$649**

16 BIT — 8088 CPU

TS1602 - 250K/1mb 8088 CPU, 8087 (math processor), 8089 (I/O Processor), NEC 7220 (graphics controller), supports CP/M 86, 2-DSDD 40T floppies & hard drive.

TS1603 - 128K/256K/1mb, 8088 CPU, Supports MS-DOS & CP/M 86, 2-DSDD 80T floppies, hard drive & mouse.

TS1605 - 98% IBM PC compatible - 128K/320K/512K, 8088 CPU. Supports all IBM PC software, includes color video, floppy controller, hard drive interface, mouse & bus extension.

TPCII - Portable version of the 1605.

TS 1602 KIT & PARTS
Same as TS802 except PCB is **$300**

TS 1603 KIT & PARTS
Same as TS 803 except PCB is **$250**

TS 1605/1605CH KIT & PARTS
Case (PS, Video Module, CRT & Keyboard), (Green)...$425, (Color) **$599**
PCB (has RGB & Composite) **$499**
Case & PCB Combo & all docs. (Green)...$899, (Color) **$1075**
DSDD 48 TPI floppy, each **$99**
Hard drive controller card **$175**
TPCII Kit & Parts — Same as 1605 except case comes with 2 floppies .... **Call**

We also have all of the PCB's in this ad in partly populated condition or as bare PCB's. In addition the following terminal PCB are also available.

910, 925, 950, 970 & the new Personal Mini Terminal

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Tandy 1000, 512k Memory Expansion plus card. By Southwestern Digital. $135. **713-480-3296**, 2515 W. Main, #337, Houston, TX 77098. 7-83

$$$WIN with Thoroughbred, Harness, Greyhound Handicapping Software...$29.95, enhanced...$49.95. Free information. **Software Exchange,** Box 5382, W. Bloomfield, Mi 48033. **313-626-7208.** 8-81

Word Processor. BASIC, Tandy 1000 or Mdel 1, 3, 4, (3 mode) 16k, 32k, 48k, tape, disk. Full featured, with automatic wraparound, centering, justifying, underlining, editing, formatting, global search/replace, form letter generation, set fonts, insert graphics. Includes 20-page manual. Specify your system. $10 tape, $12 disk, $25 Tandy 1000. **D. Hinrichs,** 2116 SE 377th, Washougal, WA 98671.

(104) TEXAS INSTRUMENTS COMPUTERS FOR SALE

Complete TI-99/4A stand-alone system B&S console, 32k, percom RS232 w/cable, recorder w/cables, TI-Writer, Logo, Forth Games, Utilities, Many business cartridges and disks, manuals, $400; TI-Pascal package w/manuals, card, disks, programs best offer over $200. **801-355-0458.**

TI-99/4A never Used. Still in box w/cassette cable. $65. I'll pay shipping. **718-855-4029.**

TI99/4A w/expansion box; 2 ea. DSDD disk drives; 32k mem exp; RS232 card; 300 baud modem; Gemini 10X parallel dmp printer w/stand. Lots of software $900. **219-277-3418** after 6pm CST. **J.C. Vandergriff,** South Bend, IN 46637.

TI CC-40 system, includes computer, 18K internal RAM, 16k RAM cart., Memo processor cart., modem, RS-232 + Centronics, Printer 80, four color plotter, 3" disk drive, AC adapters, complete documentation, cables. $1400 value, sell for $700 firm. **John O. Boyd,** 6611 Burkett St., Houston, TX 77021.**713-747-3977.**

(104A) TEXAS INSTRUMENTS COMPUTERS WANTED

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(104B) TEXAS INSTRUMENTS SOFTWARE, PERIPH.

Closeout GE Data Recorder #5158 while they last $19.95. Credit cards **1-216-399-5463. Youngtree,** PO Box 197, Levittsburg, OH 44430.

Editor Assembler with 8k ram for TI99/4A. Run machine language programs from a cassette system. Memory expansion system not needed. Kit $17, Preassembled $20. **A&T,** 224 Bond St., Neenah, WI 54956. 7-79

FREE PROGRAMS!!
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FREE SOFTWARE! Over 4000 99/4A Public Domain programs, available from the Free Access Library. Free help for 99/4A owners from the non-profit Helpline. Send SASE to **Amnion Helpline,** 116 Carl Street, San Francisco, CA 94117 for information or call **415-753-5581,** 9AM-4PM (Pacific Time), Mon.-Sat. giving free help to 99/4A owners since March, 1981. 4-80

For TI99/4A: TI Logo II $28; Microsoft Multiplan $30; TI Writer $30; Disk Utility System $6.90; Home Financial Decisions $1.95; Personal Real Estate $2.95. **Datasystems,** 2301 Churchill, Oxnard, CA 93033.

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If you like computers and you enjoy **greyhound races, then** you'll love **SHERLOCK'S HOUNDS'** amazingly accurate computerized analysis. Easy to use disk/cassette with instructions for **Atari (XLs and XEs), TI-99/4A.** For fast, insured delivery, send $29.95 today to **Swift Creek Software,** PO Box 1562-T, Cambridge, MA 02238. **Mastercard/VISA** welcome. 7-80

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NEW 99/4A PRODUCTS

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Special Close Out
32K Card $69.95, Cassette Cable $2.75, TIs Beginners Basic Tutor $3; TIs Oldies but goodies Games II $3; Add $2 shipping & Handling per order. Ohio residents add 5% sales tax. MC/Visa. Call **216-399-5463. Youngtree,** PO Box 197, Leavittsburg, OH 44430. 7-79

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Survey-Boundary TI-99/4A basic $29.95. Description $1. **P. Billings,** Dept. CSB, 12134 Bonnie Terr. Seminole, FL 33542. 6-82

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TI-99/4A NEW Software "Basic Letter" features printing of letters and envelopes in personal letter format, editing, and form letters. No expansion necessary. Available in disk or cassette for $10.00 from **Micro-Biz Hawaii,** Dept. CS, 98-1409D, Kaahumanu St., Ailea, HI 96701. **808-488-9491.** 6-79

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TIPS FROM TIGERCUB, full disk of 50 programs, files from the well-known Tigercub Tips Newsletters #1-#14, $15 postpaid. Tips vol. 2, diskfull of 64 programs, files from newsletters #15-#24, $15, or both for $27. Postpaid. **Tigercub Software,** 156 Collingswood, Columbus, OH 43213. 3-81

TI Professional Computer Low Profile Keyboard with housing, cable. new in box $65 each. MBG. **214-340-8815 or 747-4431 K. Louis.** 8-80

TI Professional Software—All new, original, unopened packages: BPI General Accounting ($129); MS-DOS ($22.50); TI Basic ver 1.1 ($15); Z-80B Coprocessor Board, Baby-Tex ($95 with full documentation/SW). **GBCS,** Box 83, Laurel, MD 20707. **301-498-0121.**

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12 Model 707's with auto access cartridge, acoustic coupler, battery pack, carrycase. $600 each, quantity breaks. **Jim 415-695-1442.**

Ti-99/4A Original Software. We've got the original TI software you've been looking for. Send SASE **Tex*In Treasures,** 1122 English Court, Belle Plaine, KS 67013-0095.

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Wallstreet Analyst TI-Basic or extended, security analysis, portfolio management, trend analysis, market evaluation, trend graphing, documentation, 2 disks or cassettes, 7 programs, 20 files, $50. **Arcade Action,** 4122 Glenway, Wauwatosa, Wisconsin 53222. 4-80

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Altos CPU's new and used all configurations fully warranteed. Upgrade kits, Altos Bundled Software, ASAP verticals. Many peripherals. Minimum 20% discount. Call **608-635-7674** for quotations, terms. **Charles Kreul,** Rte. 2, Poynette, WI 53955.

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(105A) ALTOS COMPUTERS WANTED

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586-40 ..... **$3995**
586-10 ..... **$1995**
986-409 ..... **$4995**
UK-40 (40 MB Backup for 586 Series) **$1795**
8600-12 ..... **$995**

All units (except 8600-12) new in factory packaging. 30 day guarantee, quantities limited

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(105B) ALTOS SOFTWARE, PERIPHERAL

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586-10 ..... $1995
986-40 ..... $4995
UK-40 (40 MB Backup for 586 Series) $1795
8600-12 ..... $995
All units (except 8600-12) new in factory packaging. 30 day guarantee, quantities limited

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Lots hardwares/Softwares Information on BBS#201-297-7399 (300/1200 Baud)(24 Hr./Day) (Everyday).

(106) APPLE COMPUTERS FOR SALE

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Apple II+ Clone 64k Albert, 6 slots, 2 drives, loaded $1500 worth software $485; Also BAM 128 card $60; Magnum 80 card $60; 12" Green Monitor $70; 12" Taxan Vision I RGB $175. **Tom Towsley,** Box 128, Ft. Lauderdale, FL 33302. **305-462-0241. 8-80**

Apple II+, Monitor, 4 drives, 10 I/F cards incl Modem & Eprom burner, hundreds of program disks with manuals, extra mother board, case keyboard with numeric keypad. Call **George 305-933-2623.** $1800.

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Apple Users read on - Special this month Disk Notchers $4.95 with any other item otherwise $5.75; CPM card $23; Super serial card $44; 16k card 2+ $21; Disk controller $22; 80col with soft switch $40; Extended 80col with 64k for 2e $23; ½ disk drive $98 specify 2c, 2e, 2+; Ramworks 512K $190; Laser 128 computer $390; Apple 2e pro system $1295; Mac plus $1995; Lots more send SASE for list. We pay shipping on prepaid order bank check, Visa, Mastercard, Discovery, American Express, allow two weeks for checks. Ohio residents add 6.5% tax. **W.G. Technologies,** PO Box 33627, Dayton, OH 45433.

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We have obtained a small quanitty of the Apple CPM softcard systems. These systems inlcude a Z/80 card & microsoft basic & whole bunch of manuals. WHILE THEY LAST ONLY $49. **Shreve Systems,** 845 Lark Ave., Shreveport, LA 71105. **318-865-6743** 4-9 c.s.t. 8-80

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LASER 128

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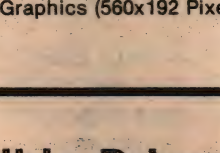

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Mac 512K, $1695; Mac Expansion Drive $350. Call **Weber Systems 216-729-2858.**

Serial I/O Board for Apple II $50 complete board with manual. 110 to 2400 baud. **Donal Retzlaff,** Rt. 1, Box 795, Quinlan, TX 75474. **214-447-3025.**

We buy and sell Apple IIe's, DEC Rainbow's, IBM PC's, XT's, AT's, etc. **Micro Resales,** 130 West Main, Urbana, IL 61801. **217-367-3621. 7-80**

WordStar SpellStar MailMerge StarIndex

+

Appli-Card CP/M Board For Apple II, IIe, II+ $149

This package includes WordStar version 3.3, SpellStar, MailMerge and StarIndex. Also included is an Appli-Card CP/M board (made by PCPI, also sold as Starcard) with CP/M 2.2, Z80B processor running at 6Mhz, 70 column display without an 80 column card (80 column display with an 80 column card). One year manufacturer's warranty. List Price $870 ..... ONLY $149
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(107) APPLE COMPUTERS WANTED

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Desperately Wanted Working Apple II(e), compatible/clone, w/disk drive for less than $300. I'm overseas w/no flea markets! **Stuart Schott,** PSC Box 2617, APO, NY 09123.

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This is a fully integrated five module accounting package with General ledger, Accounts Receivable, Accounts Payable, Payroll, and Inventory. The system requires an Apple II compatible computer, printer, dual floppy drives, or hard disk. The system is menu driven and comes with a manual. Training and custom modification are available. **Custom Software Support Systems,** 233 Maplewood Ave., Youngstown, OH 44471. **Phone 216-755-1650. 6-79**

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All Memory Expansion card. Enhanced software in EPROM. Just unplug your old EPROM and save it. Plug ours in its place. Allows DOS 3.3 Ram emulation of drive 1 & 2 for programs expecting "drive 1 program disk" and "drive 2 data disk". Allows "in program" transfers of drives into or out of RAM. Allows multiple program disk storage in ram and program swapping into drive 1 at a flick of the wrist. Requires 1 MEG ram. 256k chips available. Call for specific information. EPROM and instructions.. $29.95. Add $10 for Merlin source code. **Maricom Electronics, Inc.,** 2911 River Drive, Thunderbolt, GA 31404. **912-354-4542.** 7-79

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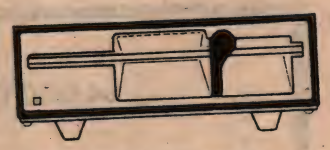

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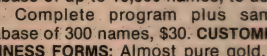

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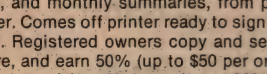

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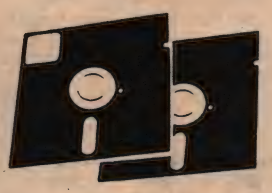

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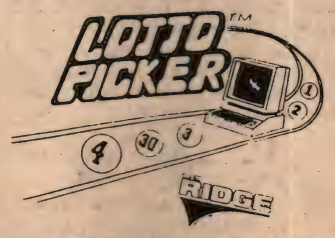

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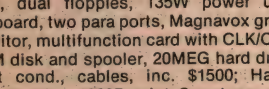

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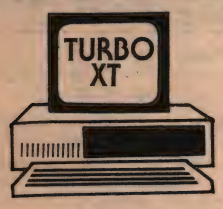

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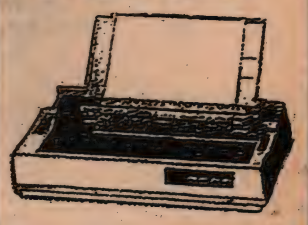

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WORDSTAR AIDS (#379) collection of the most useful utilities for the Wordstar user.
PC OUTLINE (#414) Create and collapse and outline. Great for plans, essays, etc.

DATABASE PROGRAMS

PC FILE III (#5) most popular database program from Jim Button.
U-MIND (#133) Fast hashing makes this a dandy database. (Intelligent database)
NEWBASE (#233) Menu driven database for the beginner.
PC-DBMS (#383) A relational database management system that provides on-line help and screen editing functions.
ELSIE EXPERT SYSTEM (#398) Artificial intelligence shell to build a custom knowledge-base.
PDS*BASE (#396) Complete hierarchical data base system master/detail or mother/daughter type.
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PORTSWORTH PACKAGE (#101) Evaluates your ever changing stock portfolios.
FINANCE (#164, 227) Determine present and compound values, interest rates, etc.
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TIME AND MONEY (#251) Financial record keeping and analist system.
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3 FORTHS (#352) To modify or expand your own forth language. MVPFORTH, FORTH-H and SEATTLE Computer's Forth.
PROLOG & UNIFORTH (#417) Complete with editor and documentation.
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ESIE (#398) Build and generate an expert system in a flash.
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P-BASIC (#381) BASICA work-a-like for clones, etc.

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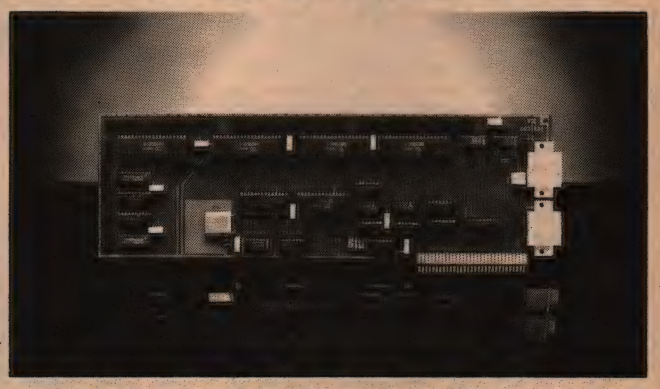

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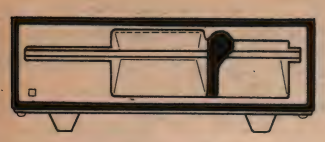

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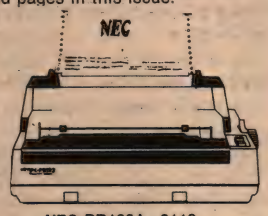

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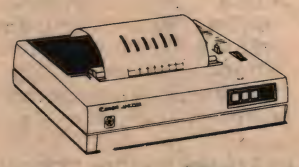

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Sanyo MBC 555-2 $595. Call **Weber Systems, 216-729-2858.**

(123A) SANYO COMPUTERS WANTED

WANTED: Sanyo 550 Video Ram Board. **216-729-3203.**

(123B) SANYO SOFTWARE, PERIPHERAL

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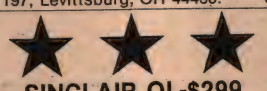
Closeout Timex 1000 computer $39.95; New (not in original carton). No manuals, cassette, cable included while they last. Credit cards. **216-399-5463, Youngtree,** PO Box 197, Levittsburg, OH 44430. 8-80



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New Boox 200 Computer Programs in basic for the T/S-1000, Z/X-81, T/S-2068 $7.95 + $1.50 p&h. **Bit/s Software,** 3202 W. Fillmore, Phoenix, AZ 85009. 6-79

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Survey-Boundary T/S-1000 $19.95. Description $1. **P. Billings,** Dept. CSC, 12134 Bonnie Terr., Seminole, FL 33542. 6-82

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Technical Newletters: TS-1 (ZX80/81, TS1000/1500) or TS-2 (2068, Spectrum, QL): Each 50+ pages, bi-monthly, encyclopeadic format 5, includes: troubleshooting maintenance, articles, projects that work, tables, problem solving, basic and MC language training courses: $20 each or both $30 per year. **SAF UG** 2749 Eden Road, Leslie, MI 49251. **517-589-5542.** 7-79

(126) MISCELLANEOUS MICROCOMPUTERS

2-CPM Computers with external dual disc (DS/DD) drives 1.2 meg. per floppy - user group software $500/each. **816-582-8511.**

3B/Journal dedicated to users of AT&T. 3B line of computers. Six issues per year $15. Complimentary first issue. Write: **Simco Computer Applications,** POB 4431, Missoula, MT 59806. 7-79

Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

Datapoint Equipment: Model 8605 Processors (two) $7,980; Model 8220 Terminals (ten) $6,995; Model 8200 Terminals (seven) $3,475; Diablo 630 Printers (two) $2,995; dual-Bin sheet feeders (two) $1,995; Dot Matrix Printer Model 9621 $500; Total $23,940. Buy entire inventory save $2,000. All equipment on Datapoint Maintenance RMS software, no charge. Add post. **Ball & Associates,** 2990 Sepulveda Blvd. #206, Los Angeles, CA 90064. Phone **213-477-2669.** 8-80

Epson PX-8/Geneva 64k laptop, built-in microcassette, ramdisk. Wordstar, Calc, Scheduler, Basic ROMs. Integral modem, P-80 Batt/AC printer. Mint condition, all boxes/manuals. $650 + frt. SASE for infor. **Nichols, 4304 West Bath, Akron, OH 44313.** 8-80.

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Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 8-87

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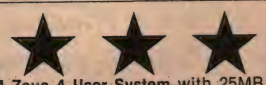

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Olivetti M-10 Lap Top Computer

Olivetti M-10 similar to Tandy Model 100 and it uses Model 100 software. Includes software, 32k ROM, 32k RAM. Excellent condition, 8 months old. Money order or cashiers check for $200. **Lawrence Greenburg Jr.,** Star Route 5, Box 394, Dunnellon, FL 32630. **904-489-4040** after 6PM.

Otrona Attache 8/16 - 640K Memory Upgrades $260; Attache 8/16's $1000 - Parts & Repair Service available. Call or Write: **D & L Enterprises, 303-452-1409,** 11506 Adams St., Thornton, CO 80233. 6-81

Radio Shack 16B with Zenix o/s 512K memory 15MB hard disk, 1 floppy, monitor, printer, 1 additional CRT. Used 3 months for development $3250. Used CRT's $75 each. Call: **Telecomp, Inc., Janice Lecordo,** 135 Cherry St., Milford, CT 06460. **203-877-5432.** 7-79

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TRUE PORTABLE SYSTEM—Use anywhere—32K Model 100 "NOTEBOOK" computer; w/"Super ROM" integrated WP/SS/DB/OL ROMware; Chipmunk 360K portable diskdrive; ARMS backup battery; casette; cables; extra software/disks; all fits shoudler bag - 8 lb.; less than 50% new price - $800 + shpg. **215-582-2639.** 8-81

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Televideo 2 806/20 multiuser computers, $14.95 each; 4 800A work stations $395 each. Guaranteed. **413-584-5668, Dolphin Communications,** PO Box 1214, Northampton, MA 01060.

Z:10G Model-II, unit, 20 Meg drive, cartriage tape, 8 serial ports, 1 parallel, 512K memory, 2 terminals, expandable. $5000. **904-478-1591.** 6-80

Zorba CP/M portable computer 64k (2) 380k drives 9" Green screen, software, documentation low hours, immaculate $550. OBO **813-681-6868** before 10pm EDST.

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(127A) XEROX COMPUTERS WANTED

(127B) XEROX SOFTWARE, PERIPHERAL

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350k storage on 80 track double sided 5¼ drives. Supports 40TSS, 40TDS, 80TSS, 80TDS simultaneously, two total drives. Includes source, format, single drive copy, and sysgen programs. Also includes new monitor eproms which allow boot from either keyboard or a seperate terminal, and also allow the Xerox to function as a stand alone ASCII terminal without disk drives.

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- **Harry S. Walters** 1101 Bassick Rd. Trumbull, Ct. 06611 203-268-3842
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Compaq portable user's manual and diagnostics disk wanted. **R.T. Duggan, 305-584-1836.** 7-79

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(129) S-100 COMPUTERS

Advanced Digital S-100 Super Six computer, 10 slot Intergrand cabinet, two Seimens FDD-100-8 disk drives, TTX 3000 terminal, and Digital Research CP/M Plus (3.0). $850. **Daniel Kinney,** 14 Damask, Belleville, IL 62220-3323. **618-235-4854.**

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Compupro/IMSAI system. IMSAI mainframe, Compupro CPU-Z (6 Mhz), 64k static ram (Jade), Compupro Disk-1 disk controller, Interfacer-1 2-port serial board, US Robotics 300/1200 baud S-100 modem, Wyse-75 Terminal, DEC LA100 240 cps printer, 2 Tandon 848-1 8" drives in enclosure, DEC 1-kva line voltage conditioner, schematics, manuals, EPROM programmer and eraser, extra front panel, IC spares, CP/M 2.2, Wordstar, Turbo, Mbasic, Infocom, more. Asking $1750. **904-396-4175.**

Compupro/Viasyn cpu 8086 $225; disk 1A $250; disk 1 $125; cpu 85/88 $165; disk 3 $275; cpu 68K-10mz $225; M-driveH 512K $250; disk 2/channel selector $200; ram 23 128K $240; ram 22 256k $525; ram 16 $100, ram 17 $125; enclosure with 20 slot motherboard and power supply $275; 20 slot motherboard $75; 12 slot motherboard $50; cpu-z $125; M-DRIVE/H 2 MEG $550; Mint ds/dd 8" floppy drive $60. **Jim Hoffman,** 6909 Sylvan Glen Way, Citrus Heights, CA 95610. **916-726-3291.** 8-80.

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COMPLETE LOT: $995
Includes manuals, schematics, software, etc. **518-439-9411, Bob Paluszak,** 12-4 Winne Place, Glenmont, NY 12077.

IMSAI 8080, Z80 CPU w/ROM monitor, 64k static RAM, serial card, parallel card, tarbell DD card, XEBEC disk interface card. Two 8" Innovex floppy drives w/PS, Lynx 10MB cartridge drive w/PS. CP/M 2.2, utilities, manuals, $495 + UPS. **Ron, 816-758-6657 or 758-6236.** 7-79

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Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 5-87

Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 8-84

Morrow Decision One Computer with 5Mb hard disk and 5" floppy drive, Heath Terminal $975. **Jim Hoffman, Phone 916-726-3291.** 8-80

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Would like to communicate with SD Systems Board Owners. Write **Gene,** Box 2607, Norman, OK 73070, or call **405-329-5704.**

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Controller/hard drive - Compupro/Viasyn disk2 with 8" 20mb fujitsu drive. Drive is in cabinet with power supply and cables $525. Mint 7" ds/dd floppy disk drive $60. **Jim Hoffman,** 6909 Sylvan Glen, Citrus Heights, CA 95610. **916-726-3291.** 8-80

IMSAI 8080 S100 Chassis $195; Electronic systems serial I/O $25; 8k-static RAM $25; 32k-Static RAM $65; 8080 CPU $40; Z80 $60; CDC 8" SSSD $45; DG-Nova2 w/Doc $175. **Jim Carroll 615-355-1061.** 7-83

S-100 Boards Solid State Music IO-4 $79; Ithaca Audio CPU Rev1.3 $65; Ithaca Audio CPU Rev2.0 $85; Vector Graphics Z-80 CPU $25; SD Single board computer SBC-100 $95; SD Expandoram 64k $75; (4) Vector Graphics 16k Static $40; SD Versa floppy I $69; SD Versa floppy II $95; Tarbell 1011A Floppy controller $49; S100 systems in cabinet with 64k, Z-80, 4 ports, 2DSDD CDC 8" drives, CPM $450. **405-360-8938.**

(131) S-50 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Add-on for SS-30 or SS-50 from $450 with software and interface. **Digital Search, 803-877-9444.**

(132) HEATH COMPUTERS FOR SALE

H/Z 89A 48k for sale: $500 or best offer. Call **217-732-9641.** 6-79

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ZP-150 PORTABLE

With 64K RAM and AC Adapter. Used only 2-3 hours. **$490** (including FREE shipping in Cont. U.S.) Call **Terry** at **916-265-4668** weekdays.

Zenith Z110; two 360K drives, 192K RAM, greenscreen, software. $1200. **Davis, 803-254-1038, 777-3739.**

(132A) HEATH SOFTWARE, PERIPHERAL

5 Megabyte add-on Hard Disk Subsystem for Heath-89. Kit $475. **Digital Search, 803-877-9444.**

Lots hardwares/Softwares Information on BBS #201-297-7399 (300/1200 Baud)(24 Hr./Day) (Everyday).

Have you ever wanted to run a program on your H-89 and couldn't find it? Get all of your programs and disks names in alphabetical order. Send large SASE to **McNeal,** PO Box 904, Warsaw, IN 46580.7-83

(133) BURROUGHS SYSTEMS

B20 Series computers, peripherals for sale from $400. **813-875-3084 Lisa.** 7-79

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201-782-7814. 8-84

(134) HEWLETT PACKARD COMPUTERS FOR SALE

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HP-110 Portable Lotus 123, Memomaker, Communications software with internal modem and 272K RAM $1500; HP9121D 31/2" dual Disk drive $650; DBasell for HP150 $200; Lotus123 for IBM $200. Call **800-826-6559.** California call **800-221-4821. 8-80.**

H.P. 7925S disk drive $3000 on maintenance. call **Scotty at 214-458-8881. 6-80**

HP86B Demo models, with 9121 S/D 82913A, 12" CRT and 7470A-002 plotter, most like new. **Stephen Computer Services, 313-478-1868, 34700 Grand River Ave., Farmington, MI 48024.** 7-83

Hewlett Packard HP-87A Computer. Almost new condition, only $400. **Televideo** Personal Terminal, only $200. Call **Bob Thomason, 502-683-9871.** 6-82

(134A) HEWLETT PACKARD COMPUTERS WANTED

(134B) HEWLETT PACKARD SOFTWARE, PERIPH.

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256k Memory boards for HP series 200/300 computers. $175 each. Hurry! Low inventory. Call **Loren at 813-493-5009.** 7-79.

HP-150 Software, R-Base 4000 $125; Memomaker, Personal Card File, DSN-Link $40 each + $4 each post. **W.M. Ent.,** 266 Hillsmere Dr., Annapolis, MD 21403. **301-263-4053.**

HP-150 Software, R-Base 4000 $125; Memomaker, Personal Card File, DSN-Link $40 each + $4 post. **W.M. Ent.,** 266 Hillsmere Dr., Annapolis, MD 21403. **301-263-4053.**

HP2225C ThinkJet. Centronics interface, fast (150 cps), bi-directional, QUIET, dot-matrix printer. Used one month. $250. **615-525-6358.** 7-79

STOCK MARKET programs for HP 86/87 computers. Powerful programs for selecting and evaluating stocks and commodities. Send $39.95 to **Lock Software,** Box 3163, Baltimore, MD 21228. Specify disk size. 9-79

(136) DATA GENERAL SYSTEMS

Nova 2/10 computer w/16KW $295; Single floppy w/control $185; LP2 Printer (unused) $350; Nova 1200 Jumbo w/16k $195; SMD disk to Nova controller (Datum) $150. **405-360-8938.**

(138) DATA GENERAL, SOFTWARE PERIPH.

(148) DEC SYSTEMS FOR SALE

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All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

DEC PRO350. Two systems w/512k, dual floppy drives, 10M HD, FPA, monitor, keyboard, one w/color and one w/a Z-chip may still be available at a super price. Plenty of software included. **S. Mills,** 4615 Orleans Blvd., Jefferson, LA 70121. **503-733-9611.**

DEC Pro350 system w/512k, 2 drives, 10M HD, Floating point adapter, mono monitor, cables. List $7245, Ask $3495. LA50 printer List $695, Ask $395. **714-627-7411 Ken.6-79**

DEC RAINBOW 100B 512k Lotus, Word Processing, MS-DOS, CP/M, Pascal, Zork. Will accept any reasonable offer. **Frank Rosato, 315-478-6681, 315-652-6219.** 7-79

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For Sale: DEC Systems, terminals, printers, spares. All eligible for DEC maintenance. **305-792-3780.**

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We buy and sell Apple IIe's, DEC Rainbow's, IBM PC's, XT's, AT's, etc. **Micro Resales,** 130 West Main, Urbana, IL 61801. **217-367-3621.** 7-80

(149) DEC SYSTEMS WANTED

(150) DEC SOFTWARE, PERIPHERAL

VT100/VT220 Replacement Terminals. $450/each w/90 day warranty, quantity pricing available. **Digital Search, 803-877-9444.**

(154) IBM SYSTEMS FOR SALE

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SN7406N	.29	SN7493N	.35
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SN7474N	.35	SN74273N	1.95
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74LS05	.25	74LS174	.39
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74LS08	.19	74LS191	.49
74LS10	.19	74LS193	.69
74LS14	.39	74LS221	.59
74LS27	.25	74LS240	.69
74LS30	.19	74LS243	.69
74LS32	.25	74LS244	.69
74LS42	.39	74LS245	.79
74LS47	.89	74LS259	1.19
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74F04	.65	74F157	1.29
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74F10	.59	74F240	2.49
74F32	.65	74F244	2.49
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74F86	.89	74F373	2.95
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CD4013	.35	CD4093	.39
CD4016	.29	CD4094	1.49
CD4017	.49	CD40103	2.95
CD4018	.69	CD4503	.49
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CD4027	.39	CD4515	1.39
CD4030	.39	CD4518	.79
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HM6264P-12	8192 x 8	(120ns) CMOS	4.09
HM6264LP-12	8192 x 8	(120ns) L.P. CMOS	4.29
HM6264P-15	8192 x 8	(150ns) CMOS	3.75
HM6264LP-15	8192 x 8	(150ns) L.P. CMOS	3.89
6514	1024 x 4	(350ns) CMOS (UPD444C)	4.49

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TMS2516	2048 x 8	(450ns) 25V	4.95
TMS2532	4096 x 8	(450ns) 25V	5.95
TMS2564	8192 x 8	(450ns) 25V	8.95
2708	1024 x 8	(450ns)	3.49
TMS2716	2048 x 8	(450ns) 3 voltage	9.95
2716	2048 x 8	(450ns)	3.15
2716-1	2048 x 8	(350ns) 25V	4.95
27C16	2048 x 8	CMOS	6.49
2732	4096 x 8	(450ns)	3.75
2732A-20	4096 x 8	(200ns) 21V	3.95
2732A-25	4096 x 8	(250ns) 21V	3.49
2732A-45	4096 x 8	(450ns) 21V	3.29
27C32	4096 x 8	CMOS	6.49
2758	1024 x 8	(450ns) Single +5V	2.95
2764-20	8192 x 8	(200ns) 21V	3.95
2764-25	8192 x 8	(250ns) 21V	3.49
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2764-45	8192 x 8	(450ns) 21V	3.25
27C64	8192 x 8	CMOS 21V	4.95
27128-25	16,384 x 8	(250ns) 128K 21V	3.25
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68764	8192 x 8	(450ns) 25V	15.95
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DT1057 - Expands the **DT1050** vocabulary from 137 words to over 250 words. Includes two (2) ROMs and specs.

DT1057 . . . . . $11.95

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7107CPL	8.95	7217AIPI	8.95
7107EV/Kit	46.95	7224IPL	10.95
7207AIPD	5.95	7226AEV/Kit	99.95

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74HC00	.35	74HC175	.89
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74HC08	.39	74HC244	1.49
74HC10	.39	74HC245	1.59
74HC14	.59	74HC253	.79
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74C04	.25	74C221	1.19
74C08	.35	74C240	1.59
74C10	.29	74C244	1.59
74C14	.49	74C373	1.95
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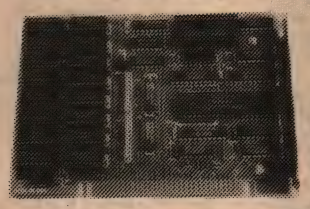

The **Zuckerboard Expansion Memory Board** allows you to expand the memory of your Tandy 1000 (128K Model) as much as 640K! 256K DRAM chips increase your computer's memory by either 256K or 512K, bringing your total system memory up to either 384K or 640K. The memory board also includes a DMA controller chip. Optional clock/calendar plugs directly onto the memory board. Manual included.

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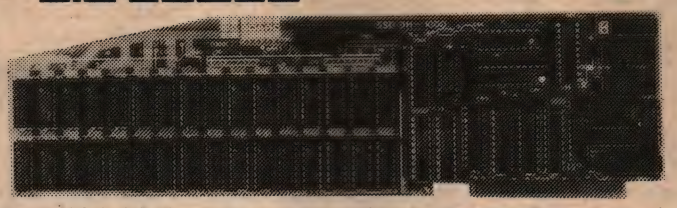

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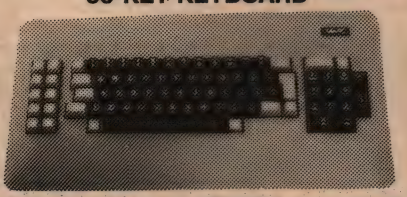

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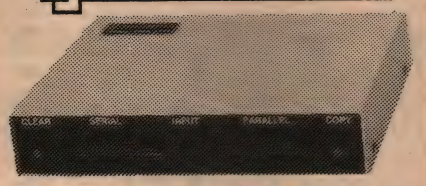

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8" Shugart MOD SA 860-1 double sided drives in unused condition with full 1 year warranty. These drives replace old MOD 800, 801, 850, 851, Require no AC and are direct drive. Capacity is 1.6 MB, Track to track access time is 3MS. **CEC,** PO Box 1965, Burlingame, CA 94010. **415-342-4058.** 5-90

2 TANDON DSDD 848-2 half-height drives 1.2 M each. Nearly new! Original price $500 each, asking $135 each. Call **Gretchen** at **707-823-0904 or 823-6731** (message).

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8" Shugart MOD SA 860-1 double sided drives in unused condition with full 1 year warranty. These drives replace old MOD 800, 801, 850, 851, Require no AC and are direct drive. Capacity is 1.6 MB, Track to track access time is 3MS. **CEC,** PO Box 1965, Burlingame, CA 94010. **415-342-4058.**

8" drive in case with power. $100 **317-545-4734. Mark Sims.**

Shugart Model SA 810 SSDD 8" half-height in mint condition. These drives do not require AC. Track to Track access time 3MS. Capacity is 800 K-byte. Includes full one year warranty. $269. **C.E.C., 800-228-3411,** 1206 S. Amphlett Bl. #3, San Mateo, CA 94402.

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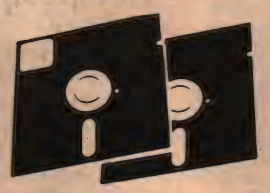

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BCE 1-800-545-7447
Ask for Operator 28.

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Winchester Drive Sale. Shugart SA1002. 8"-5 megabytes, 2 for $100, controller kit $200. **Digital Search, 803-877-9444.**

Shugart Model SA 860 8" DSDD half-height mint condition. These drives do not require AC. Track to Track access time is 3MS. Capacity is 1.6 meg-byte. Includes full one year warranty. $279. **C.E.C. 800-228-3411,** 1206 S. Amphlett Bl. #3, San Mateo, CA 94402.

8" Shugart MOD SA 860-1 double sided drives in unused condition with full 1 year warranty. These drives replace old MOD 800, 801, 850, 851, Require no AC and are direct drive. Capacity is 1.6 MB, Track to track access time is 3MS. **CEC,** PO Box 1965, Burlingame, CA 94010. **415-342-4058.**

Shugart Model SA 860 8" DSDD half-height mint condition. These drives do not require AC. Track to Track access time is 3MS. Capacity is 1.6 meg-byte. Includes full one year warranty. $279. **C.E.C. 800-228-3411,** 1206 S. Amphlett Bl. #3, San Mateo, CA 94402.

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8" SSDD ½ Height Shugart Mod SA 810-1 unused condition with full one year warranty. Price $269. These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however, they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.6-79!**

(174) PRINTERS

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DIABLO 620

Letter Quality Daisywheel, 25cps, RS-232 (serial), 15" carriage, Dealer close out at $399 + shp, While stock lasts. **W.M. Ent.,** 266 Hillsmere Dr., Annapolis, MD 21403. **301-263-4053.**

Diablo 620
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Diablo Hy-type-I printer mechanisms complete $75 manual included. Diablo forms tractor Hy-type-I, Hy-type-II $50 each. All Plus UPS. **919-833-9672.** 7-81

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Epson Tractor for LX-80 (new in box) $20; parallel or Serial board for LQ 1500 (new in box) $50 each. **GBCS,** Box 83, Laurel, MD 20707. **301-498-0121.**

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(181) CRT TERMINALS

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(182) TERMINALS

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(184) MEMORY

(186) MODEMS

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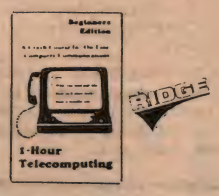

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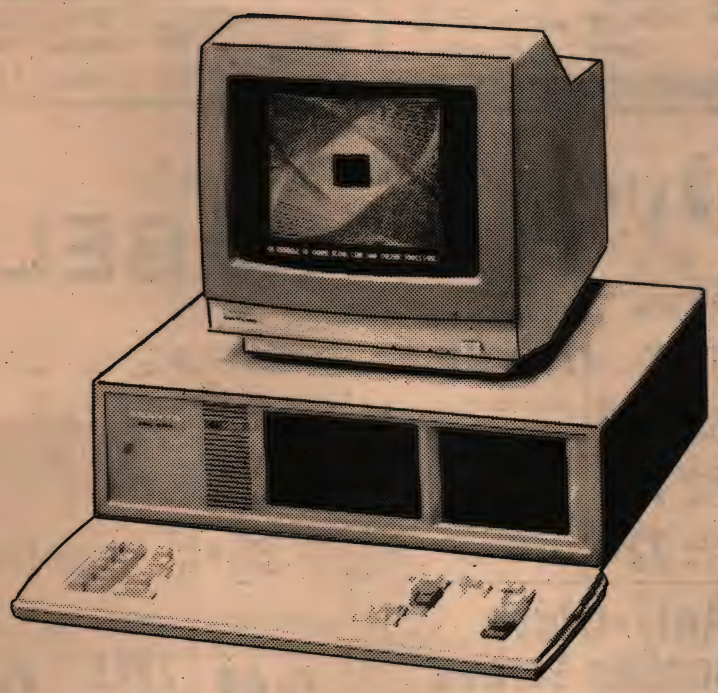

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S·Side 96tpi	15.75	DC 300A	16.60	8" Disks	
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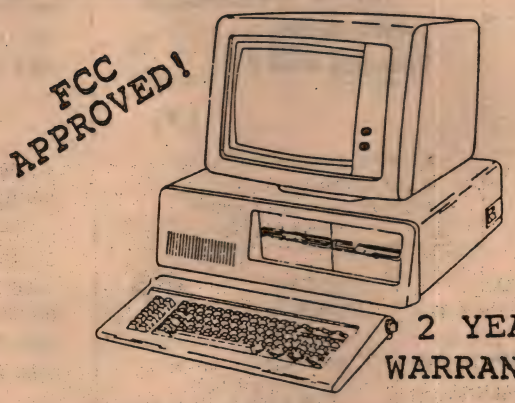
* slide-out PC case
* 135W hard-disk ready power supply
* 5150 style keyboard
* 8 card slots * 640K RAM
* fully tested * MS-DOS 3.1/manual
* optional math co-processor (see list)



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* TTL or composite, amber or green monitor
* slide-out PC case
* 135W hard-disk ready power supply
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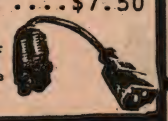
NOW PLUG ANY MONITOR INTO THE PC POWER SUPPLY

End the irritation of having to turn your monitor off separately from your computer. Simply plug this adaptor into the monitor socket and plug the monitor into the adaptor, then one switch will handle monitor and computer.



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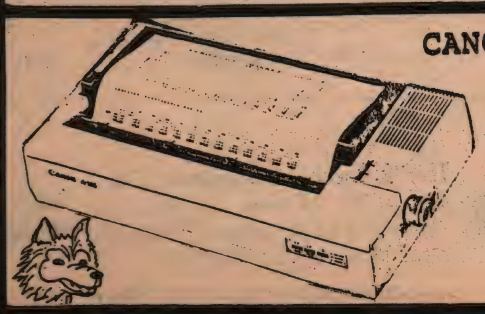

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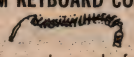

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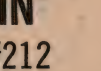

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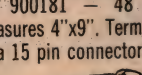

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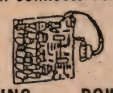
PS-4A



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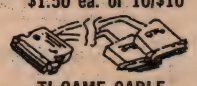

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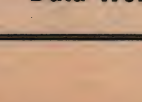

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Transformer for above **$3.50**

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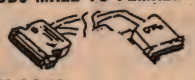

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FOR YOUR XT MOTHERBOARD

NEW

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CLONE XT SCHEMATICS
with Waveforms for easy servicing.
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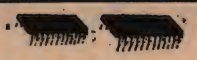

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A new 2 chip BIOS set that replaces the BIOS on your XT or Turbo XT motherboard. These eliminate many of the system & parity errors that occur. Also eliminates "lock-up" problems in some Turbo XT boards. IBM compatible.
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TURBO XT SUPER ROM

If you think your Turbo board is fast – put this new BIOS ROM in it & hold your socks! This is the fastest ROM we've seen for a Turbo bd. yet.
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KEYBOARDS Microswitch

ASCII Encoded keyboard, mfg. by Micro Switch. Has 92 Keys.
Part #92SC40-16-1.
Stk# KBD-92 .....$9.95

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Paradyne Computer Housing can be used as an external case to house hard or floppy disk drives. Contains 150W power supply. IBM colors.
Stk# CASE-P $65

CPM BOOT DISKETTE FOR $3.75
V-20 Processor

PUBLIC DOMAIN PROGRAMS – $3.75 DISK MS DOS COMPATIBLE

PD#	PROGRAM TITLE
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2	PC-Finance (Accounting)
3	PC-Checkbook
4	PC-Modem (Communications)
5	PC-Spreadsheet
6	Home Finance Program
7	Free Calc - Spreadsheet
8	Pc-Basic (runs Basic prog.)
9	PC-Calculator
10	Point of Sale Program
11	Misc. DOS Super Utilities
12	8087 Sampler Programs
13	Misc Appl., Music, Dates
14	Poor Man's Mouse
15	PC DOS Help
16	Word Proces. for Kids
17	Time & Money - Finance Mngr.
18	PC-Musician
19	Property Mngr. (DBase II)
20	Silly Diagnostics
21	Micro Accounting System
22	File Manager
23	A Cheap Assembler, RAM Disk
24	PC Graphics 1
25	PC Graphics 2
26	Portfolio Evaluation System
27	Newkey - Keyboard Program
28	Star Trek Programs
29	Games 1
30	Games 2
31	Basic Games
32	Basic Games
33	Misc Basic Games
34	Galaxy Trek w/Graphics
35	CPU Speed Test
36	Benchmarks

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- Green TTL Monitor
- Keyed power switch
- Hardware reset switch
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- 3 disk drive slots

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DAVONG HARD DISK CONTROLLER, FOR IBM COMPATIBLE SYS . . $49.95

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ELECTRONIC SURPLUS COMPONENTS & GOOD STUFF

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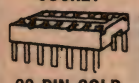

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5 Pcs. $1.00
Stk. #ICS-22M

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16 Amp On/Off
Used in Xerox 820 Computers

Full Wave Bridge
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MICRO-SWITCH
ASS'T OF 10
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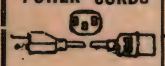

$1.75 EA
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Sound generator boards removed from electronic pin-ball games. Contains oscillators, control circuits & 2 watt audio amp. Experimenter's dream!!!
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w/schematics

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Regulator board containing 5V & 12V to-220 regulators, fuses, bridges, caps & I/O connectors. Size 2"x4" w/heatsinks.
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Contains (4) 10 Amp bridges, (3) large filter caps, & I/O conn. Size 4.5" & 8".
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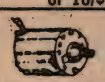

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GIANT CAPACITOR ASSORTMENT
500 PCS. $9.95

COMMODORE GAME PLASTIC HOUSING
25¢
CHS-128

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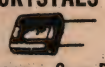

Frequency	Case	Price
40 MHZ	HC18	$1.25
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8 OMHZ	HC18	$1.25
10 7MHZ	HC18	$.75
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LS04 ...$.15	LS132 ..$.40	LS244 ..$.50
LS05 ...$.15	LS133 ..$.25	LS245 ..$.50
LS08 ...$.15	LS138 ..$.35	LS251 ..$.45
LS09 ...$.15	LS139 ..$.30	LS253 ..$.40
LS10 ...$.15	LS145 ..$.55	LS257 ..$.45
LS11 ...$.15	LS151 ..$.40	LS258 ..$.50
LS12 ...$.25	LS153 ..$.30	LS259 .$1.00
LS13 ...$.30	LS154 ..$.75	LS260 ..$.40
LS14 ...$.25	LS155 ..$.40	LS266 ..$.30
LS15 ...$.30	LS156 ..$.40	LS273 ..$.75
LS20 ...$.15	LS157 ..$.30	LS279 ..$.30
LS21 ...$.18	LS158 ..$.40	LS280 ..$.80
LS27 ...$.21	LS160 ..$.50	LS283 ..$.35
LS30 ...$.15	LS161 ..$.40	LS290 ..$.65
LS32 ...$.20	LS162 ..$.60	LS293 ..$.75
LS33 ...$.25	LS163 ..$.35	LS298 ..$.65
LS37 ...$.30	LS164 ..$.50	LS299 .$1.50
LS38 ...$.25	LS165 ..$.80	LS322 .$2.50
LS42 ...$.30	LS166 ..$.75	LS323 .$2.25
LS51 ...$.20	LS169 .$1.00	LS364 ..$.90
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LS55 ...$.20	LS175 ..$.35	LS367 ..$.40
LS73 ...$.30	LS181 .$1.25	LS368 ..$.30
LS74 ...$.23	LS191 ..$.80	LS373 ..$.50
LS85 ...$.45	LS192 ..$.70	LS374 ..$.75
LS86 ...$.19	LS193 ..$.74	LS375 ..$.35
LS93 ...$.50	LS194 ..$.60	LS377 ..$.90
LS107 ..$.28	LS195 ..$.50	LS378 ..$.80
LS109 ..$.20	LS196 ..$.70	LS390 ..$.80
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MILTON BRADLEY XFMR.
Input: 120VAC
Output: 12VAC
CT @ 1.7AMP
UL Approved
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7905 5v 1.5 amp
7912 12v 1.5 amp
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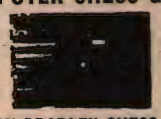
Ass't of 10
Stk. #CCG-10 ..$2.50

COMPUTER CHESS GAME



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500 PC 2N2222
Un-Marked — $3.50

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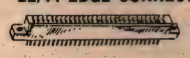
ALL ARE 1.56" SPACING.
22/44 EDGE CONNECTOR



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31/62 Connector for IBM PC Board, .1" spacing $2.50

4" COOLING FAN
120 VAC
NEW
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2" Bar Magnet with Tape On One Side
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POWER SUPPLY
5V@35 AMP
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12 VOLT MINIATURE PC BOARD RELAY

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Heat sink ass't
All Types Incl.

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Special — 2/$1.00
7/8" Diameter element on plasting mounting. Originally used in Radio Shack telephone as the ringer.
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9 conductor Spectrastrip with red marker strip. 250' per roll. 28ga. stranded wire. WRIB-9 .....$10/roll
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For V20 CHIP
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Vinyl Diskette Holder
Holds 2-5¼" diskettes. Has 3 hole punch to mount in standard loose leaf folder. Stk. #1 VIN-5 .....10/$2.50
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CERAMIC MONOLYTHIC CAPS. FOR ALL TYPES OF COMPUTER APPLICATIONS. ULTRA STABLE.

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CMO-473	.047	50	.11
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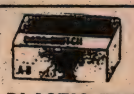

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$.40 #CRD 6

DIABLO TYPE 30 POWER SUPPLIES
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$15.00

ALTOS 8000 COMP.
$250

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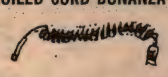

4 conductor coiled cord. Black vinyl jacket. Extends to 6 ft. No connectors on either end.
Stk. #CC-000 ....3/$1.00
4 Conductor coiled cord. Black vinyl jacket. Extends to 6 ft. Phone connector on one end and no connector on the other.
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Stk. #CC-100 .....$4.00

BUILD YOUR OWN EPROM ERASER
115VAC BLACK LIGHT
(ULTRA VIOLET)

115 volt ultra violet light, with lamp, ballast and in-line cord switch. Just build enclosure to finish.
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Input: 110VAC
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Mfg. by Signal Trans
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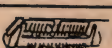

40 pin.....$.40
34 pin.....$.50
10 pin.....$.25

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5 Ohm @
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55 CHANNEL CONVERTER

Mainboard — $7.50
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We Received A Large Shipment Of These Cable Converters. Good Savings!

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TV-GAME SWITCH
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ELECTRONIC COMPONENT BONANZA

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Res100	Precision res. assort. 1% & 2% types. 100 pcs.	$2.59
Res1000	Res. assort. 1000pcs. All sizes & values	$3.25
Re100p	100 miniature trimpots, pc mount	$4.79
Re25p	25 tv and radio pots. Good selection	$2.79
Re25g	25 ganged pots. Hard to find types	$3.25
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Ch15	Slug tuned if coils, 15 pcs.	$2.29
Ch20	Open wound tuning coils, 20pcs.	$2.29
Ch10	Transfmr style choke. 60mh, 10 pcs.	$2.29
Cp100	100pc. electrolytic assort. Great values	$3.37
Cp100d	Ceramic disc caps, 100pcs., great values	$2.59
Cp25hv	High voltage disc-caps, 1Kv min. 25 pcs.	$2.79
Cp25p	25pcs. polystyrene caps, high stability	$1.79
Cp685	Nichicon 6800mf-@50v, 12 pcs.	$2.75
*Cp316	Mepco 3000mf.@16v, low est. 12 pcs.	$3.75
Cp12s	Mallory low esr switching caps. 10pcs.	$3.75
Cp100ma	100 mylar bypass & coupling caps. Axial	$3.75
Cp100mr	100 mylar bypass & coupling caps. Radial	$4.25
Cp25t	Tantalum assortment, 25pcs.	$3.55
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Cp13cg	Mallory computer grade caps. 13pcs.	$4.79
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Di100s	100 silicon diodes, in4148 types, etc.	$2.25
Di15p	15pcs. power diodes. 2 amps & above	$2.75
Q50m	50 Magnavox tv replacement transistors	$3.79
Q100a	100 small signal transistors. Pnp & npn	$4.79
Q150r	150 rf transistors. Metal can. unmarked	$1.79
Q10p	TO-220 power transistors. 10pcs. pnp & npn	$2.29
F3	6' inline fuse holder w/3amp fuse, 3 pcs.	$.99
Cb10	10 airpax circuit breakers, 3 to 25amps	$4.49
Cn30m	30pc molex connector & socket assortment	$3.49
Bs25	25pc. barrier strip assort. 2 to 20 connects	$2.55
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"An Educational System that lets you stay current with todays technologies!"

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2HOURS — Assembly procedure of today's IBM Clone machines. Covers both turbo & standard systems. Descriptions of product variations & how to deal with them. Tips on quick problem determination.

TAPE A1-B

Same as A1-A but covers the AT Clone computer systems.

TAPE A2

2HOURS — Discusses the problems in dealing with Turbo systems. Covers incompatabilities, timing, & component level troubleshooting. Geared for the technician with basic knowledge of electronics troubleshooting.

TAPE A3

2HOURS — Covers all video from basic color/mono environments to NEC-7220 boards. CAD, Hardware pan & zoom the new Hitachi video processor & the IBM series of display adapters & monitors.

TAPE B-1

2HOURS — Illustrates proper final configuration of Clone systems. Includes prompts, directories, defaults & bat-files. Geared towards minimizing end user confusion during first days of computer use.

TAPE B2

2HOURS — Provides a basic education on interrupts, base port addresses, contentions, & incompatibilities among resident software packages. For the consultant who specializes in full business systems.

TAPE B3

2HOURS — Understanding hard disks & tape back-up systems. The 32 Meg limitation, 3rd party drivers, getting around track 0 problems. Unattended tape back-up useage. Using large drives from the mini environment.

TAPE C1

2HOURS — Advanced troubleshooting geared to the consultant trying to minimize repair time & lessen dependency on vendor tech support. Includes preventive maintenance.

TAPE C2

2HOURS — Simple to advance networks. Includes Lan Link Netware, 3-COM, PC-NET, & Orchid. Discussion on choosing the right network for your application.

TAPE C3-Q1

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These tapes are designed for VARs, consultants, & technicians who deal with IBM's and Clones on a regular basis. We have put together the knowledge of our technical staff who answer customer questions & problems every day. This knowledge will be immeasureable for your business or personal use.

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- 2716-27256 & Special Motorola MCM68764 & all "A" series EPROMS
- Connects thru parallel port
- Fast algorithm software

*** NOTE! IT IS ILLEGAL TO USE THIS DEVICE TO COPY REAL IBM ROMS**

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STOCK#	DESCRIPTION	PRICE
FDC-501	Floppy disk controller w/cable - 4 drives	$38
FDC-507	Floppy Cont. w/serial, parallel & clock	$95
HDC-515	Hard disk controller w/cables	$125
VID-401	Color Graphics Cards, IBM Specs	$60
VID-405	Magic Video card w/TTL, RGB, & Composite outputs 640x400 color, 640x352 monochrome	$185
VID-406	Monochrome (TTL) card	$75
VID-408	Hi-Res mono/graphics w/printer port Hercules compatible	$85
SIO-250	Serial port card (second serial opt.)	$35
PIO-255	Parallel printer card	$29
MFC-110	Short I/O, parallel, serial, clk/cal	$99
MFC-100	Multi-funct. w/para., ser., clok/cal & 384K Exp. No mem. installed, software	$90
MFC-120	576K memory expansion board (short card)	$39
EP-128	EPROM burner board, for IBM (2716-27128)	$129
RD-2	Bus Receiver & driver boards for exp. chasis	$149

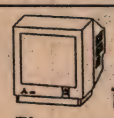
SPECIAL BOARDS

Everex Enhancer EGA card . $249
Adaptec 2070A RLL hard disk contr. $185

AT PARTS CENTER

STOCK#	AT SYSTEM COMPONENTS	PRICE
MBD-AT	AT clone motherbd., dual speed (6&8 MHZ), 1 Meg. RAM, 0 watt state, clock, BIOS included, with OK installed	$599
HDC-525	Combination hard & floppy disk contr., mfg. by NCL, 4-layer bd	$195
CAB-525	Cable set for above controller	$20
HDC-526	AT controller for hard disk only by NCL, 16 bit bus.	$169
VID-425	Enhanced graphics adapter	$295
MFC-3002	Multi-func. w/para., ser. & 2 meg. memory exp. capability, w/0K memory	$225
MFC-110	Serial, Parallel & game pots	$85
PS-200	AT Power supply - 200 watt	$135
KYB-MAXI	Maxiswitch keyboard for AT or XT	$75
CASE-90	Case for At-slide type	$89
TFDD-1.2	Teac 1.2Meg floppy drive	$135

MONITORS



MITSUBISHI RGB—640x200 Tilt & Swivel — 14" — $325
Thompson RGB — 560x200 — $285
NEC Multisync $549.00
Samsung TTL $89.95
Samsung Composite $64.95
Center TTL $84.95

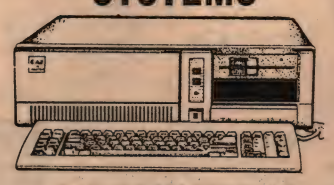
HARD DRIVE KITS SPECIALS

10 Meg & Controller $305
20 Meg & Controller $419
45 Meg & controller $725
130 Meg & controller $3850

MODEMS

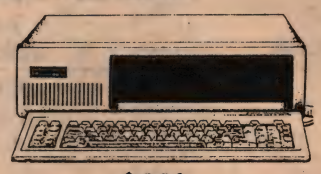
(100% HAYES COMPAT.)
Everex 300/1200 Internal $149
Lytek 300/1200 External $149

FCC APPROVED SYSTEMS



CAF PC-MASTER AT $1495.00

- 8MHZ Operation
- 512K RAM Expandable to 1MB
- AT Style Keyboard
- Hard/Floppy Disk Controller
- One 1.2MB Floppy Drive (can read, write & format 360K disk)
- 8 MHz 8 slots
- DOS 3.1 and Manuals



$449

- 640K Motherboard, 256K
- 135 Watt Power Supply
- Keyboard
- Metal Slide Case
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- Shipped Double Boxed

FCC APPROVED KEYBOARDS

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JB MICRO — Mfg. by Microswitch 5151 Style - AT/XT selectable $99.00

IBM® AT CLONE SYSTEM

- 80286 Process @ 8 MHZ
- 640K RAM (1 meg. max)
- 20 meg. hard drive
- Dual floppy drives
- Monochrome graphics
- High Res. monochrome monitor
- I/O Ports
- Bundled Programs

$1979

3RD GENERATION TURBO SYSTEM

- 20 Meg Drive
- Super 4-layer MBD running @ 8MHZ
- Single DSDD Drive
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- Bundled programs

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360K ½ hgt., 48 TPI . . $79.95
TEAC 1.2 Meg (AT) . . . $135.00

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135 WATT $69.00
150 Watt $75.00
200 Watt AT $105

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Slide Flip-Top **$37.50**

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640K Max., 4.7 MHZ, 8 I/O slots, with 0 mem. $115
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640K Max., 5/7 MHZ, 2-layer board, tested with 9 mem. $130
TURBO XT-640-8A
640K Max., 5/8 MHZ, 2-layer board, tested with 0 mem $135
SUPER TURBO XT-640-8B
640K Max., 5/8 MHZ, 4-layer board, tested with 0 mem. $165

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13933 N. Central #212
Dallas, TX 75243
1-214-234-8032

LOLIR—ADDISON, TX
15902 Midway
Addison, TX 75234
1-214-458-1886

LOLIR — FARMERS BRANCH, TX
3216 Beltline #606
Farmers Branch, TX 75234
1-214-241-2145

LOLIR — SAN ANTONIO, TX
218 E. Rhapsody
San Antonio, TX 78216
1-512-525-0261

LOLIR-FT. WORTH
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59¢

Why buy a **No Name Disk** when you can get a **Quality Memorex Disk** with a **Lifetime Guarantee** for **Less?**

- 5¼"
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These disks come complete with Memorex's Lifetime Replacement Guarantee, Memorex Warranty Card and Memorex Toll Free Customer Support Line.

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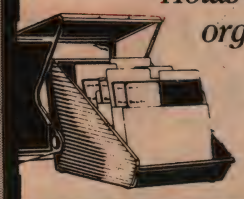
With each order of Memorex disks, we'll send you a Memorex FLIP 'N' FILE, absolutely FREE! Holds up to 70 disks—keeps them organized and dust free!



While Supplies Last.

Retail Value $20.00

100% Satisfaction Guaranteed

Lifetime replacement guarantee from Memorex plus 15 day trial. If you are not completely satisfied with these disks for any reason, simply call within 15 days of receipt for a complete refund.

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MM361-C8	100 Memorex DSDD Disks	.65	$ 65	$ 8
MM362-C8	200 Memorex DSDD Disks	.63	$126	$20
MM370-C8	1000 Memorex DSDD Disks	.59	$590	$40

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Customer Service Inquiries:
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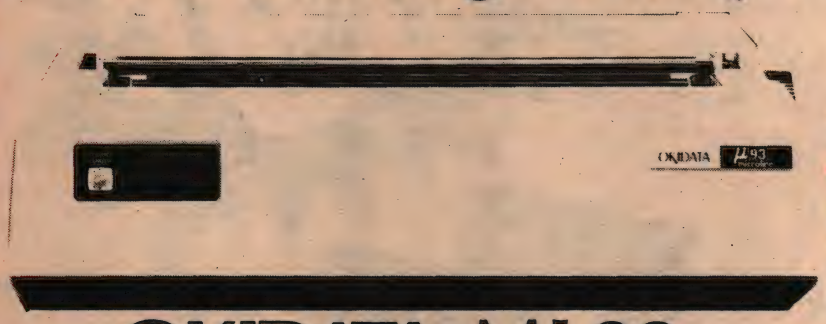
BCE LIQUIDATION!

Printer Liquidation!

Wide Carriage NLQ Printer



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We Will Match Or Beat Any Price In This Issue On This Printer!

OKIDATA ML93

- 160 CPS Bidirectional Printing
- 40 CPS NLQ
- Tractorfeed
- Heavy Duty Construction—Built To Last
- Parallel Centronics Interface

Available In Three Versions

- Parallel
- Parallel w/IBM Plug 'N' Play PROM *(With Complete IBM Character Set)*
- Serial

Features & Specifications

- 160 CPS Bi-Directional Printing
- 40 CPS Near Letter Quality Printing
- Enhanced, Emphasized and Expanded printing
- 136 Columns with Standard Printing
- 233 Columns with Condensed Characters
- 163 Columns with 12 CPI
- 9-Pin, Long-Life Print Head
- Form Length Selectable From Front Panel
- Superscripts and Subscripts
- True Descenders
- Underlining
- Proportional Spacing
- Horizontal Tabs
- Six Program-Selectable Character Sizes
- 6 and 8 Lines Per Inch Vertical Spacing
- Tractor and Friction Feed Paper Handling
- Self Test, Operator Accessible
- All Points Addressable Graphics
- 90 Day Warranty, Parts and Labor; *1 Year Warranty on Print Head*
- Nationwide Service Available

Print Speed: Draft Mode 160 cps; Emphasized and enhanced mode 80 cps; Near letter quality mode 40 cps.
Print Method: Dot matrix impact, bi-directional, short line seeking.
Character Matrix: 9x9 Draft; 9x17 Near letter quality
Characters Per Line: Variable—68 to 233.
Graphics: All Points Addressable graphics 60x72 dpi, 72x72 dpi.
Maximum Width of Paper: 15" (16" with tractor feed).
Ribbon: Genuine Okidata Spool type (Part #52100701).
MTBF: 4000 hours.
Power: 90 watts.
Physical Dimensions: Size: 20.1"(W) x 12.9"(D) x 5.2"(H); Weight: 30.9 lbs.

100% Satisfaction Guarantee

Full 90 day warranty on parts and labor and 1 year warranty on printhead from Okidata, plus 15 day trial. If you are not completely satisfied with this printer for any reason, simply call to return it within 15 days of receipt for a complete refund.

Ordering Information

All units subject to availability.

Product #	Item	Price	Shipping
OK93P-C8	Okidata ML93 - Parallel	$299	FREE!
OK93I-C8	Okidata ML93 - Parallel w/IBM Plug 'N' Play	$299	FREE!
OK93S-C8	Okidata ML93 - Serial	$399	FREE!
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CA250-C8	Centronics to Centronics Parallel Cable	$19	FREE!

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Near Letter Quality

```
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abcdefghijklmnopqrstuvwxyz
0123456789 (!)~'!"#$%&' :;<=>?@
```

Condensed

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789
```

Draft

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789 (!)~'!"#$%&' ()*+,-./
```

Elite

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789 (!)~'!"#$%&' ()*+,-.
```

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Product Information:
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Customer Service Inquiries:
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100% IBM Compatible

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Manufacturers of Olivetti PC

ONLY $799

With 512K RAM, Hi-Res Monitor and 2 Drives

Model PC 325

- 2 Half Height 360K DSDD Floppy Drives With Space For a Hard Disk
- Serial and Parallel Ports
- MS-DOS 2.11, GW Basic 2.0, PC Tutor
- 14" Hi-Res TTL Swivel/Tilt Monitor
- 640 x 325 Pixels
- IBM Selectric Style Keyboard
- 90 Day Manufacturer's Warranty
- 4 Full Length Expansion Slots
- Nationwide Service Available
- 110 Watt Power Supply
- 8088 Processor

With 256K RAM, Monitor and 2 Drives ONLY $749

Why buy a No-Name Clone when you can get a Brand Name Computer with Manufacturer's Warranty for Less!

100% Satisfaction Guarantee
Full 90 day manufacturer's warranty plus 15 day trial. If you are not satisfied with this computer for any reason, simply call within 15 days of receipt for a complete refund.

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Ordering Information

Product #	Item	Price	Shipping
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CR512-C8	Corona PC 325 w/512K RAM	$799	$29

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The Twin

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- ▲ Reads and Writes Lotus Files
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- ▲ Not Copy Protected
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100% Satisfaction Guaranteed

Unprecedented!

We Trust You!

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"Twin has a wider selection of graph types, styles and options than 1-2-3."

"Anyone who uses release 1A of 1-2-3 would be completely at home working with Twin."

—PC Week, May 6, 1986

Spreadsheet Features

• 255 by 8192 worksheet area • Macros, both keyboard and global with iteration and user defined • Macro compatibility • Reads and writes 1-2-3 data files directly • Financial Functions: FV, PV, PMT, RATE, MIRR, NPV, IRR, NPER • Statistical Functions: MIN, MAX, STD, VAR, COUNT, SUM, AVG • Database Statistical Functions: DSUM, DAVG, DCOUNT, DVAR, DSTD, DMIN, DMAX • Logical Functions: #NOT#, #AND#, #OR#, TRUE, FALSE, IF, AND, OR, NOT, ISNA, ISERR, >, <, =, >=, <=, <> • Mathematical Functions: +, -, *, /, ACOS, ATAN, ASIN, COS, TAN, SIN, ABS, EXP, INT, LOG, MOD, PI, ROUND, SQRT, ATN ±, SQRT, RAND LN • Selection Functions: CHOOSE, HLOOKUP, VLOOKUP • Date Functions: DATE, TODAY, DAY, MONTH, YEAR • Translate data from other programs without exiting program • Configure hardware with easy to use input from screen, without exiting program • Flexible color definition of the TWIN on your screen • Print Headers and Footers with date and page number functions

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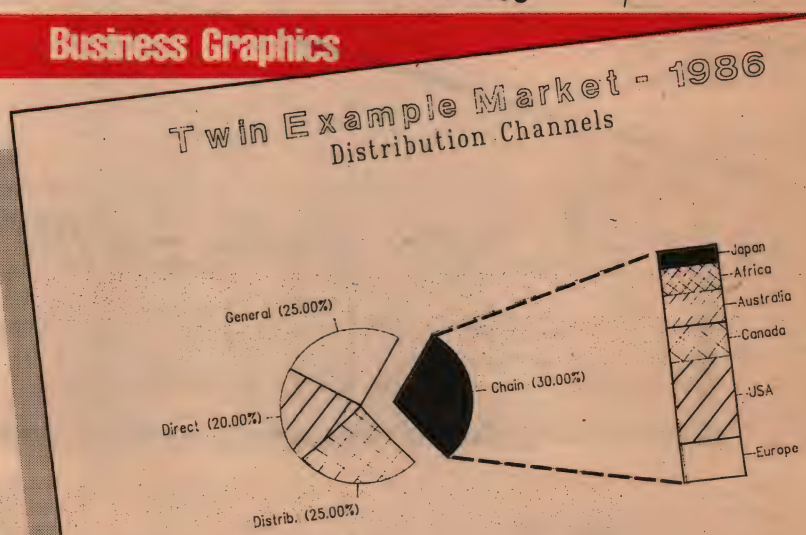
• Graphics created directly from spreadsheet data • Pie charts 2-D, 3-D • Pie-Bar combination • Colors and shading definable for each slice • Slices can be exploded • Vertical bars 2-D clustered, 2-D stacked, 3-D clustered • Colors and shadings for bars user definable • Bar top labels • X-axis, Y-axis, and grids are optional • Line charts of up to 8 lines per chart • Color and line type for each line is user definable • Linear or LOG axis in any combination • All charts have 3 lines of titles and 3 lines of footnotes. Each 8 sizes, 8 different colors, different fonts, left-center-right justified • 11 different text fonts • Plotting with plotters on paper or transparency • Hercules and color monitors supported • Simultaneous display on 2 monitors • 2 level graphics. Analysis and Presentation • Special "FILL-IN-THE-BLANKS" INPUT FORMS • On screen slide presentation • Print and plot without exiting program.



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SOFTWARE BCE

Nutshell Database Manager

New Upgraded Version 2.0!

PC Magazine's Editor's Choice! *(July 1986)*

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For IBM and All Compatible Systems

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- **Word Processing and Calculating Features**
- **Unlimited Display Capability**—Create and store as many layouts as you like for each database
- **Customer Support**—Complete Documentation, Toll Free Support Line, 1 Year Warranty
- Easy Data Entry Using Lists, Ranges, Unique and Ditto Commands
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- **Flexible**—You can easily alter the size of your fields and create as many records and files as you have disk space for
- **Indexing Capability**—Each word and number in your database is automatically indexed and stored

"Nutshell is one of the best-kept secrets among database management software."

"Nutshell is the simplest, most intuitive and attractive flatfile database manager on the market." —PC Week, April 8, 1986

"Nutshell offers both ease of use and unusual versatility." —PC Magazine, July 1986

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NUTSHELL TECHNICAL SPECIFICATIONS

- **Fields per record:** Variable: 60,000 maximum*
- **Number of keys per record:** All fields are keys
- **Characters per field:** Variable: 16 million maximum*
- **Characters per record:** Variable: 16 million maximum*
- **Files per disk:** Limited only by disk space
- **Layouts per file:** 2 million maximum*
- **Records per file:** 2 billion maximum*
- **Digits of accuracy:** 14 decimal digits
- **Range of dates:** 1/1/0000 to 12/31/3000
- **Size of layout:** Variable: 240 columns by 65000 lines maximum
- **Sort fields:** Unlimited characters
- **Query speed:** A single key search locates a unique record from 1000 records in two seconds.

* subject to disk space limitations

FILE STRUCTURE

- Unlimited number of key fields
- Hierarchical file structure
- Text/Numeric/Data/Calculated/ Summary fields

REPORTS

- Custom forms preparation
- Save and recall up to 60,000 reports per file
- Preview reports on the screen, up to 240 columns, 65,000 lines
- Unlimited formatting capability
- Visual field placement
- Totals/Counts/Averages
- Control breaks with sub-totals, sub-counts, and sub-averages at any sort level
- Multi-field sorts (performed automatically)
- Label formats
- Input from ASCII file, DIF and dBase II®
- Output to ASCII file, DIF and dBase II®

DOCUMENTATION

- Over 25 context-dependent Help screens
- Comprehensive reference manual
- Sample applications

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BCE LEADING EDGE®

Leading Edge® Word Processor For IBM and All Compatible Systems

ONLY $39

Basic & Simple Version — Mfr. Retail ~~$100.00~~ **$39**

With Spelling Checker and Merge/Print Options — Mfr. Retail ~~$250.00~~ **$49**

Lowest Prices Anywhere!

"The Leading Edge Word Processor offers the best balance of user friendliness, performance and features of all the programs tested."

Software Digest, January 1986.

Software Digest is an independent publication which accepts no advertising. Other programs tested included WordPerfect, Volkswriter Deluxe, WordStar 2000 Plus and Microsoft World.

This program is a gem, and at $250, it's also a gem of a bargain.

—PC Magazine, January 28, 1986

100% Satisfaction Guaranteed

Unprecedented!

We Trust You!

If you are not completely satisfied with this software after a 15 day trial, simply call us to return it for a complete refund.

Features:

- Automatically backs up your programs, even if you forget
- Makes two backup copies, not just one
- Splits screen for access to two documents at once
- Recalls deleted characters if you change your mind
- Prints up to seven colors with compatible printers including IBM, Epson, Diablo, C.Itoh, NEC, Qume, Star Micronics.
- Underlines important words or phrases **on screen**
- Toll-free support line
- Adds or deletes characters
- Marks ends of pages where you want them
- Prints boldface, double wide, italics, underscores, superscripts. and subscripts
- Comes complete with training disk and reference manual.
- Sets and resets margins and tabs
- Moves blocks of type
- Merges paragraphs
- Centers words, lines, and columns

Ordering Information

Product #	Item	Price	Shipping
LE999-C8	Basic & Simple Word Processor	$39	$5
LE888-C8	Word Processor with Spelling Checker and Merge/Print	$49	$5

Add $5 shipping and handling per item.

Quantity Discounts Available

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Department C8
Washington, DC 20007

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ONLY $3995

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8086, 8" DSDD Floppy, 20 MB Fixed Drive, Demo
ALTOS
ONLY $995

All Units New In Factory Packaging (Except 8600).

100% Satisfaction Guaranteed!
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Customer Service Inquiries:
1-800-231-3549, 9-5 EST, M-F

Dot Matrix Printer BCE

~~Mfr. Retail~~
~~$499.00~~

Liquidation Price $129

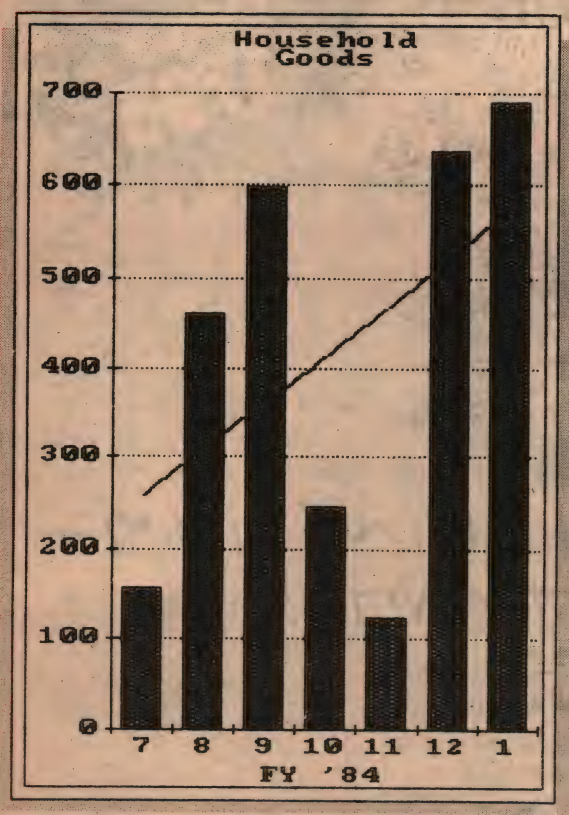
74% OFF

Does Apple and IBM Graphics!

Compatible With Apple Graphics Printer and NEC 8023.

Print Samples:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890-=!@#$%^&*()_+{}
```



Transportable!

Built-in handle and light weight make this printer the ideal companion to any portable computer!

Space-Saving!

Takes up only a 14″ × 5″ area on your desktop!

100% Satisfaction Guarantee

Full 90 day factory warranty plus 15 day trial. If you are not satisfied with this printer for any reason, simply call within 15 days of receipt for a full refund.

Ordering Information

Product #	Item	Price	Shipping
NC802-C8	NEC PC-8027A Printer	$129	$17
CA200-C8	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C8	Centronics to Centronics Parallel Cable	$19	

Call Toll Free to Charge

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Built-In Paper Bin!

No need to carry around bulky boxes of computer paper!

Specifications:

- **Printing Method:** Impact Dot Matrix; Logic Seeking
- **Matrix:** 9x9 Alphanumeric, Greek; 8x8 Dot Graphics; 11x7 CG Graphics
- **Speed:** 105 CPS
- **Compatibility:** Fully compatible with Apple Graphics Printer and NEC 8023.
- **Characters Per Line:** Pica 80 CPL; Condensed 136 CPL; Elite 96 CPL
- **Character Sets:** 16 Character Sets standard
- **Paper Feed Method:** Friction, Pin Feed
- **Interface:** Centronics Parallel, Works with IBM, Apple, Kaypro, etc.
- **Buffer Size:** 2K
- **Dimensions:** 14.88″(L) x 12.00″(H) x 4.33″(W)
- **Weight:** 13.2 lbs.
- **Ink Ribbon:** Cartridge Type 8023A-01; Color—Black; Life—2 million characters

Ordering Information

Please specify Product Number when ordering. We ship UPS Ground anywhere in the continental USA. Allow three weeks shipping time. To return an item, call customer service (1-800-231-3549) for an authorization number. Quantities of all items are limited. Order Now!

VISA *Order Toll Free* MasterCard

1-800-545-7447

Product Information:
1-202-944-3900, 9-5 EST, M-F

Customer Service Inquiries:
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BCE LIQUIDATION!

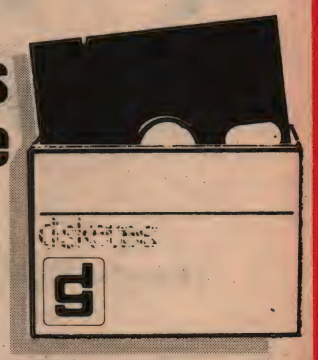
Modem Liquidation!

Hayes Compatible 1200 Baud

83% OFF

Mfr. Retail ~~$750.00~~
Liquidation Price **$129**

FREE! **Communications Software**



2 Year Factory Warranty!

- Runs Smartcom, PC-Talk, Crosstalk and Most Other Communications Software
- Tested 100 Times More Reliable Than The Competition Under Poor Transmission Conditions
- Easy to Use Software for IBM PC Included
- Made by General DataComm, Maker of Communications Equipment For Bell Operating Companies and Fortune 1000 Corporations
- 2 Year Factory Warranty!

Runs Smartcom, PC-Talk, Crosstalk and Many More!

Features

Modem

- Autodial / Autoanswer
- 300 / 1200 bps
- Touch Tone or Pulse Compatible
- LED Display
- Built-in Speaker
- External, RS232-C Interface
- 2 Year Warranty
- FCC Registered

Communications Software

- Easy to Use — So easy you may not even need the manual!
- Single Key Auto Dial and Auto Logon
- Menu Driven and Command Driven
- File Transfer, Complete with error correction
- Macro Strings — Define up to 36 pre-arranged phrases, each with a 2 key command
- Printer Control, continuous or page-at-a-time

Specifications

Data Rates: 1200 bps, 0 to 300 bps
Data Format: Serial binary; asynchronous; 7 or 8 data bit; 1 or 2 stop bits; odd, even or no parity.
LED Indicators: Terminal ready, modem ready, carrier on, send data, receive data, automatic answer, test mode, high speed.
Diagnostics: Analog loopback, digital loopback, self-test.
Compatibility: Bell 103, 113, 212.
Connectors: Power cord and telephone cord included.
Power: 117 VAC ± 10%, 60 Hz; UL listed.
Size: 1.4" x 6.9" x 10.4"

Product #	Item	Price
GD500-C8	General DataComm Acculine 1200 Modem	$129
CA300-C8	Serial Cable (Male to Male)	$ 19
Add $9 per modem shipping and handling.		

100% Satisfaction Guarantee
Full 2 year warranty plus 15 day trial. If you are not completely satisfied for any reason, simply call within 15 days for a complete refund.

Order Toll Free!

1-800-545-7447

Quantity Discounts Available

Or Send Check or Money Order To

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Department C8
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Washington, DC 20007

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Customer Service Inquiries
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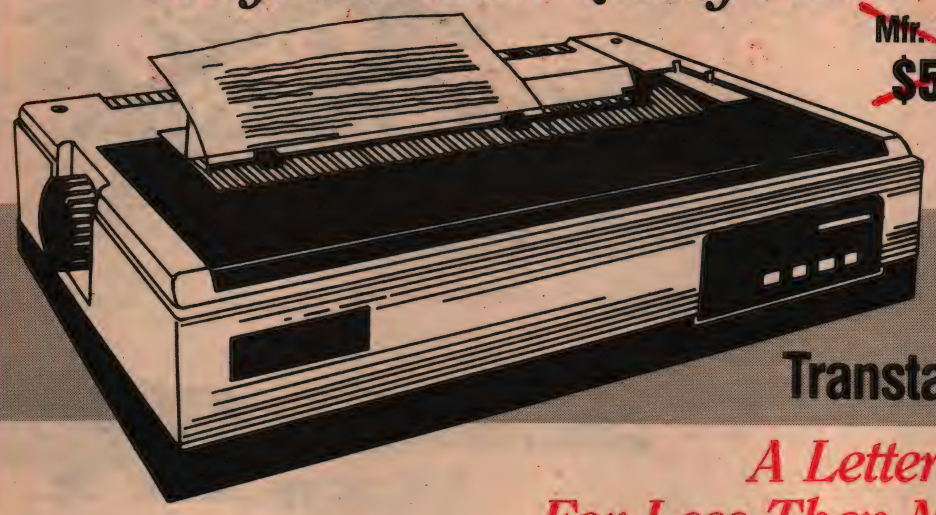
Printer Liquidation!

Daisywheel Letter Quality Printer

~~Mfr. Sug. Retail $550.00~~

69% OFF



Transtar 120 *only* **$169**

A Letter Quality Printer For Less Than Most Dot Matrix Printers!

- 14 CPS
- Automatic Paper Loading
- Parallel and Serial Models Available
- Works With Most Word Processing Software
- Lightweight and Portable
- 6 Month Warranty

Specifications

Print Speed: 14 characters per second *(cps)* *(Shannon Text)*
Print Method: fully formed daisy wheel characters
Character Set: ASCII 96-character, upper and lower case
Character Spacing: 10, 12, and 15 cpi, switch selectable
Horizontal Spacing: 1/20th-inch increments
Vertical Line Spacing: 1/48th-inch increments
Forms Width: 13 inches maximum
Line Feed Speed: 2 inches per second
Carriage Return Speed: 1200 ms per 10 inches

Ribbon: fabric or mylar *(single strike)* cartridge, Olivetti compatible
Printwheel: 96-character plastic daisy wheel, 10, 12, and 15 cpi
Interface: Model 120P: Centronics-compatible 8-bit parallel; Model 120S: EIA RS232 serial, supporting DTR, XON/XOFF or ETX/ACK protocol
Baud Rates: Model 120S: 300, 600, 1200, 2400, 4800, and 9600 bits per second *(switch selectable)*
Buffer Size: Model 120S: 1790 bytes
Parity: Model 120S: Even, Odd, None *(switch selectable)*

Code Compatibility: Plug and software compatible with Diablo 1610/1620 routines *(except two-color ribbon)* for full feature compatibility with leading word processing packages
Software Enhancements: Software selectable form length from 1 to 126 lines
Paper Thickness: Original plus 3 copies *(maximum)*
Automatic Paper Loading: Autoload function loads paper to one of four switch-selectable positions
Power Requirements: 120 VAC 60 Hz at 1.5 amps
Noise: 65 dB(A) or less
Dimensions: 17.5″(W) x 4.8″(H) x 12.4″(D)
Weight: 18.7 lbs.

Ordering Information

Product #	Item	Price	Shipping
TS120S-C8	Transtar 120—Serial Model	$169	$17
TS120P-C8	Transtar 120—Parallel Model	$169	$17
CA200-C8	IBM Parallel Cable	$ 19	FREE SHIPPING WITH PRINTER
CA250-C8	Centronics to Centronics Parallel Cable	$ 19	
CA300-C8	Serial Printer Cable	$ 19	

100% Satisfaction Guarantee

Full 6 month manufacturer's warranty plus 15 day 100% satisfaction guarantee. If you are not completely satisfied with this printer for any reason, simply call to return it within 15 days for a full refund.

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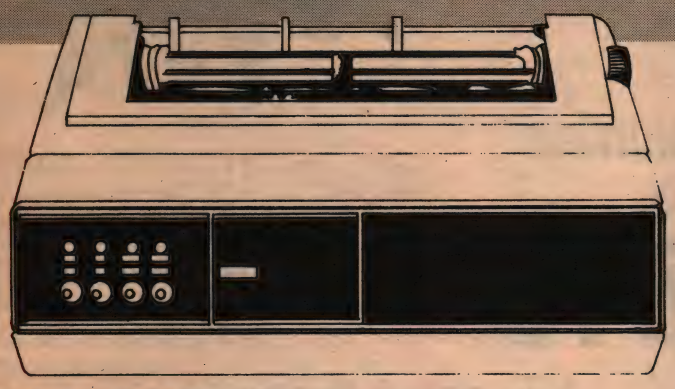
Printer Liquidation!

400 CPS High Speed Heavy Duty

For Drafts • Program Listings • High Speed Back-Up Printer • etc.

76% OFF LIST



Mfr. Retail ~~$2495.00~~

***Liquidation Price* $599**

Diablo P38

- 400 CPS Bi-Directional Printing
- High Reliability—No Maintenance Required, No Adjustments
- Long Life Ribbon
- Built-In Tractorfeed For Rear Or Bottom Paper Feed
- Parallel Interface

Specifications

Character Format:
Format: 7x7 matrix
Size: .104″ x .076 (2.64mm x 1.94mm)
Elongated: Double width characters, software selectable at character level.

Print Speed:
Characters per second: 400± 5%
Lines per minute:

Characters per line	40	60	80	132
Lines per minute	340	260	220	140

Print Head:
14 Needle Design

Character Sets:
Standard 96 Character ASCII
Selectable 7 National character sets selected via toggle switch.

Line Format:
Line Length: 132 characters
Buffer Capacity: 256 Characters max.

Character Density: 10 CPI
Autoprint: The buffer content is automatically printed when the buffer is full, when more than 132 printable characters are received or upon reading a CR or LF instruction.

Page Format:
Form Length: Set via rotary switch between 3½ and 14″, software overidable between 1 and 255 lines.
Tabulation: Max. 10 vertical tabs (set via escape code VT and line number).
Bottom of form: Software selectable (via escape code EM and Line number)
Line Density: Set via toggle switch, software overidable.
Normal: 6 lpi
Compressed: 8 lpi

Ribbon Cartridge:
Black, available in normal (2 million character life expectancy) and long life (8 million character life expectancy).

Paper:
Sprocket-edge, fanfold paper, 3″ to 15″ (76.2mm to 381mm), fed from either rear or bottom feed slots through width-adjustable tractors. Speed of line feed is 55 msec at 8″ per second. Paper tear off is 3.5″ (88.9mm) above print line. Paper empty detection switch is 2″ (50.8mm) below print line, and informs host when paper is ½ inch below print line.

Copies:
Original plus four copies (more if carbonless paper used). Multiple copy level located inside printer case.

Power requirements:
120 VAC, 60 Hz, 170 Watts max, +10/–15%

Dimensions:
Width 22.0″ (560mm)
Depth 16.1″ (410mm)
Height 8.2″ (210mm)
Weight 39.5 lbs. (18kg)

Ordering Information

Product #	Item	Price	Shipping
DP38-C8	Diablo P38 Printer	$599	$22
CA200-C8	IBM Parallel Cable	$19	FREE SHIPPING WITH PRINTER ORDER
CA250-C8	Centronics to Centronics Parallel Cable	$19	

100% Satisfaction Guarantee

Full 90 day manufacturer's warranty plus 15 day trial. If you are not satisfied with this printer for any reason, simply call within 15 days of receipt to return it for a complete refund.

Order Toll Free!
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Quantity Discounts Available

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BCE LIQUIDATION!

Printer Liquidation!

Letter Quality Printer
With Sheetfeeder
Or Tractorfeed

Mfr. Retail
~~$698.00~~

60% OFF

Liquidation Price
$249

INCLUDES SHEETFEEDER OR TRACTORFEEDER

- Diablo 630 Compatible
- 75 Sheet Automatic Cutsheet Feeder Or Bi-Directional Tractorfeed
- Parallel Interface
- 1 Year Factory Warranty

Model DX2000
- 20 CPS
- 13″ Carriage

$249

Model DX2500
- 25 CPS
- 15″ Carriage

$299

Features

For Both Axiom DX 2000 and Axiom DX 2500

- 75 Sheet Auto Cutsheet Feeder *or* Bi-Directional Tractorfeed
- 10, 12, 15 Pitch plus Proportional Spacing
- Pitch Selection from Front Panel
- 2K Buffer Memory
- Bi-Directional Printing
- Diablo 630 Software Compatible
- Uses Diablo 630 Ribbon Cartridges
- Uses Qume Printwheels
- 1 Year Factory Warranty
- 2 Day Turnaround Post-Warranty Service

Specifications

Interface: Centronics Parallel, Works With IBM, Apple, Kaypro, etc. **Print Head Life:** 36 million characters **Print Wheel:** Numerous Fonts Available **Character Pitch:** 10, 12, 15, Proportional—Front panel selectable **Copy Capacity:** 1 original plus 3 copies **Line Spacing:** 6, 4 or 3 lines per inch **Ribbon:** Diablo Hy-Type II **Paper Feed:** Bi-Directional Friction Feed Standard **Paper Feed Speed:** 20 lines per second **Noise Level:** Less than 60 dB **Character Set:** 96 characters (ASCII) **Buffer Size:** 2K bytes

Why Such A Bargain?

How can we sell such a high quality letter quality printer with a sheetfeeder or tractorfeed for less than the cost of many sheetfeeders alone? The answer is simple.

These printers were manufactured by Axiom, a company well known in the industry for very expensive high quality and high speed printers for medical and scientific applications. They tried to expand their product line into the word processing market with these printers, the DX 2000 and DX 2500. Unfortunately for them, they were unable to compete successfully for dealer shelf space with already established brands, so they decided to concentrate their efforts on their scientific printers again.

But their loss is your gain. We bought the remaining inventory at a great price, and we're passing the savings on to you. Quite frankly, these are some of the best printers we've ever carried. They're Diablo 630 compatible, so they will work with all standard word processing programs. They use readily available Diablo ribbon cartridges and Qume printwheels. The sheetfeeder works like a dream—it lets you print up to 75 separate sheets without stopping to change the paper!

We're not alone in our praise for the Axiom DX 2000 and DX 2500. PC Magazine, in the September 17, 1985, issue, said, "It's got everything you would expect to find in a daisywheel. It's also quieter than most printers. The sound is subdued, even-tones, and nonabrasive. We like these printers so much we use them in our office."

We're so sure you'll like this printer that we give you a 15 day trial in addition to the 1 year factory warranty. If you are not satisfied with this printer for any reason, simply call us within 15 days for a complete refund. Now what could be more fair than that?

Free Software or Flip-N-File

Buy any Axiom Printer and we will send you FREE: Leading Edge Word Processing software; TWIN *(a Lotus 1-2-3 look-alike)*; Nutshell *(Database Manager)*; or a Flip-N-File Diskette holder.

Quantities Limited—Subject to Availability

FREE!

Buy any Axiom printer and get your choice of one of these Leading Edge Software Products ***ABSOLUTELY FREE!***

Leading Edge Word Processor
With Merge & Print Options

The Twin
Lotus Look-Alike

Nutshell Database Manager
See Our Other Ads For Details

Ordering Information

Product #	Item	Price	Shipping
AX20S-C8	Axiom DX 2000 Printer w/Sheetfeeder	$249	$26
AX20T-C8	Axiom DX 2000 Printer w/Tractorfeed	$249	$26
AX20TS-C8	Axiom DX 2000 Printer w/Tractorfeed & Sheetfeeder	$298	$26
AX25S-C8	Axiom DX 2500 Printer w/Sheetfeeder	$299	$26
AX25T-C8	Axiom DX 2500 Printer w/Tractorfeed	$299	$26
AX25TS-C8	Axiom DX 2500 Printer w/Tractorfeed & Sheetfeeder	$348	$26
CA200-C8	IBM Parallel Cable	$ 19	FREE SHIPPING WITH PRINTER ORDER
CA250-C8	Centronics to Centronics Parallel Cable	$ 19	

100% Satisfaction Guarantee

Full 1 year factory warranty plus 15 day trial. If you are not satisfied with this printer for any reason, simply call within 15 days of receipt for a full refund.

Call Toll Free to Charge
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Washington, DC 20007

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VISA MasterCard

Order Toll Free
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Customer Service Inquiries:
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BCE

WordStar Software Liquidation

By MicroPro.

$29 UP

WordStar

$29

SpellStar

$29

StarIndex

Prices will never be lower than this!

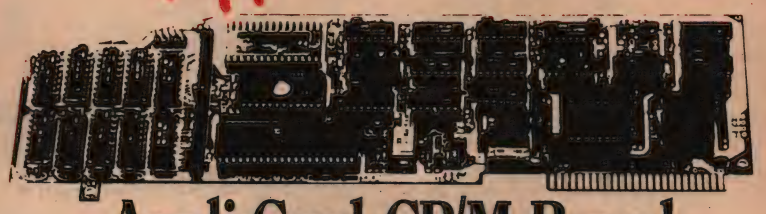
$29

CorrectStar

$29

MailMerge

$99



Appli-Card CP/M Board

For Apple II, II+, IIe:

BEST BUY

WordStar Professional And Applicard CP/M Board. Mfr. Retail $870.00.
Product #AP616-C6.....*ONLY* **$149**

WordStar Professional—Contains WordStar (The Industry Standard Word Processor), SpellStar, MailMerge and StarIndex. Mfr. Retail $495.00.
Product #AP617-C6.....*ONLY* **$119**

Applicard CP/M Board—Made by PCPI (Also Sold as Starcard). Best on the market! Includes CP/M 2.2, Z80B, 6 MHz, 70 column display without an 80 column card (or 80 column display with an 80 column card). Mfr. Retail $375.00. *Product #AP618-C6*.....*ONLY* **$99**

SpellStar—Allows you to check spelling using 20,000 word dictionary. Mfr. Retail $99.00.
Product #AP261-C6.....*ONLY* **$29**

MailMerge—Creates mailing lists, merges files. Mfr. Retail $99.00
Product #AP281-C6.....*ONLY* **$29**

StarIndex—Creates indices and tables of contents. Mfr. Retail $99.00
Product #AP271-C6.....*ONLY* **$29**

For IBM PC:

CorrectStar—(Updated SpellStar) 65,000 word dictionary; Just type a word the way it sounds and Correct-Star will find the correct spelling. Mfr. Retail $145.00.
Product #P161-C6.....*ONLY* **$29**

MailMerge—Mfr. Retail $99.00
Product #P181-C6.....*ONLY* **$29**

StarIndex—Mfr. Retail $99.00
Product #P171-C6.....*ONLY* **$29**

Add $8 Per Item Shipping and Handling.

At these prices they won't last long! Order Today!

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Lowest Prices Anywhere!

Printer Liquidation

7 Color Ink Jet Printer

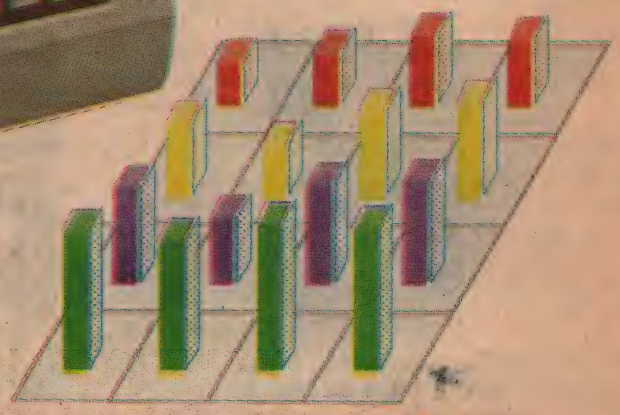
Canon PJ-1080A

72% OFF LIST

Liquidation Price

$199

IBM Retail ~~$745.00~~
Mfg. Sug. Retail ~~$699.00~~



Features:

- **Seven bold colors—red, blue, yellow, green, magenta, cyan, black**
- **Quiet, high-speed-prints at 37 cps and under 50 dB**
- **High resolution—640 dots per line**
- **Advanced drop on demand ink jet printing system**
- **Large capacity ink cartridges—approx. 3.2 million characters per color**
- **Black or white reversible background**
- **Automatic vertical and horizontal tabulation**
- **Page length per inch setting**
- **International character sets selectable**
- **Overhead projection film can be used**

Works With These Popular Software Packages:

Lotus 123	Keychart
PC Paintbrush	Telescan Analyzer
PFS Graph	Chart, Decision & Sign Master
PFS Write	EV Capture
Colorscreenprint	The Weather Station
Snapshot	PJ-Handler
Infographics	

And More...

Specifications

Printing method: Drop on demand ink jet printing
Print head: Piezo-electric type
Nozzle: Four horizontally arranged nozzles
Printing direction: Bi-directional line scanning
Printing characters: Character composition: Standard 5x7 dot matrix; Character set: full ASCII character set (96) and special characters; Character size: 1.5 x 2.7mm (standard), 3.0 x 2.7mm (enlarged)
Maximum characters per line: 80 chars per line standard, 40 chars per line enlarged
Image printing: Image data: vertical 8 dot information; Resolution: 560 dots per line
Color hard copy: Data: horizontal 8 dot information; Resolution: 640 dots per line
Interface: 8 bit parallel interface (Centronix type)
Paper: Paper type: plain paper; Roll paper: max width 8½" max., diameter 2¾"; Single sheet: max width 8½"
Overhead projection film: A-4 single sheet (Canon specified only)
Ink cartridge: Type: dual-cartridge ink supply; Ink amount: black-25cc, other colors—20cc each; Ink life: approx. 3.5 million characters per color
Physical dimensions: Size: 15¾" x 11⅝" x 4¼"; Weight: 12.3 lbs.

Print samples.

Send Check or Money Order or Charge

100% Satisfaction Guarantee
One year factory warranty plus 15 day trial. If you are not completely satisfied for any reason simply call us within 15 days for a full refund.

Quantity Discounts Available

When ordering, please specify **Product #C710-C8.**

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$199
Add $12 shipping and handling

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VISA MasterCard

Order Toll Free

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Product Information:
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Customer Service Inquiries:
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Lowest Prices Anywhere!

Printer Liquidation

40 CPS Wide Carriage Letter Quality Daisywheel Printer

~~Mfr. Sug. Retail $1795.00~~

80% OFF

Liquidation Price

$349

Made by TEC, *(Manufacturer of C. Itoh Starwriter F10-40)*.

WITH CUT SHEET FEEDER— ONLY $518

- Diablo 630 Compatible
- 40 CPS
- Parallel Interface
- Works with IBM, Apple, Kaypro, and Most Other Brands
- Optional Sheetfeeder and Tractor feed

Features & Specifications

- Heavy duty aluminum diecast frame.
- Easily accessible dip switches for quick changing of print modes.
- Parallel centronics interface—works with Apple, IBM, Kaypro, etc.
- Automatic Self-Test.
- Automatic print pressure control prolongs print wheel life by varying printing pressure according to character shape.
- Paper Out Detector interrupts print operation.
- Uses standard Diablo printwheels and ribbon cartridges.
- Tractorfeed and sheetfeeder available.
- Underscore, double strike, and shadow print capabilities.
- Proportional spacing.
- Completely software compatible with Diablo 630.
- Full 90 day factory warranty.
- 15 Day Trial.
- Nationwide service available.

Print Speed: 40 cps printing.
Buffer: 2K Buffer memory.
Number of columns: 136 (Pica pitch), 163 (Elite pitch)
Print spacing (min): 1/120 in.
Line feed spacing (min): 1/48 in.
Paper width: 15 in.; Print area, 13.6 in.
Printing System: Static font impact system
Number of copies: Original plus 2 copies (0.2mm thick)
Number of character types per wheel: 96
Fonts: Courier 10 standard, plus all other Diablo fonts
Pitch: 10, 12, 15, proportional
Interface: Centronics parallel
Power Source: 90-127 Volts at 60hz
Noise Level: Less than 65db
Physical dimensions: 6"(H) x 16"(W) x 24"(L)
Weight: 30.8 lbs.

Why Such A Bargain?

This is a high quality 100% Diablo 630 compatible printer. It will work with just about all word processing software—since the Diablo 630 is the most standard word processing printer format there is. It uses Diablo ribbon cartridges and printwheels, so you can get supplies at any office supply store.

It was made by TEC and is mechanically "similar" to the C.Itoh Starwriter F10-40, made by the same manufacturer. It has a reputation as being one of the best printers made. So how can we sell it so cheaply?

The answer is simple—like many computer products, this printer was sold by one company to another company, which put its own label on it. In this case, TEC sold these printers to Commodore, which intended to sell them with an expensive business computer they were developing. The expensive computer took a lot longer to develop than Commodore anticipated—so they were stuck with these printers. Then they tried to sell them with their inexpensive computers—and you can imagine the result. How many people do you think would buy a printer with a list price of $1795 to go with a Commodore 64? You're right. Very few.

So we were able to acquire a great printer, made by a company known for its high quality printers, with only one drawback—the Commodore label on it, which falsely suggests that it is a low end printer.

However, the label can be a real advantage should your printer ever need service. Service is available not only at many dealers who repair C.Itoh and TEC printers, but also at all the hundreds of Commodore factory authorized service centers, located practically everywhere!

There is a 90 day factory warranty from Commodore. In addition, we guarantee you 100% satisfaction—no questions asked return within 15 days. What could be fairer?

FREE RIBBONS!

With every Commodore 6400 printer order, we'll send you 6 Diablo 630 type fabric ribbon cartridges, **absolutely free!**

While Supplies Last!

100% Satisfaction Guarantee

Full 90 day factory warranty plus 15 day trial. If you are not completely satisfied for any reason, simply call within 15 days of receipt for a full refund.

Quantity Discounts Available

Ordering Information

Product #	Item	List Price	BCE Price	Shipping
LQ400-C8	Letter Quality Printer	$1795	$349	$22
LQ420-C8	Letter Quality Printer w/Tractorfeed	2044	468	27
LQ440-C8	Letter Quality Printer w/Sheetfeeder	2194	518	29
LQ460-C8	Letter Quality Printer w/Tractorfeed & Sheetfeeder	2443	617	34
CA200-C8	IBM Parallel Cable	35	19	FREE SHIPPING WITH PRINTER ORDER
CA250-C8	Centronics to Centronics Parallel Cable	35	19	

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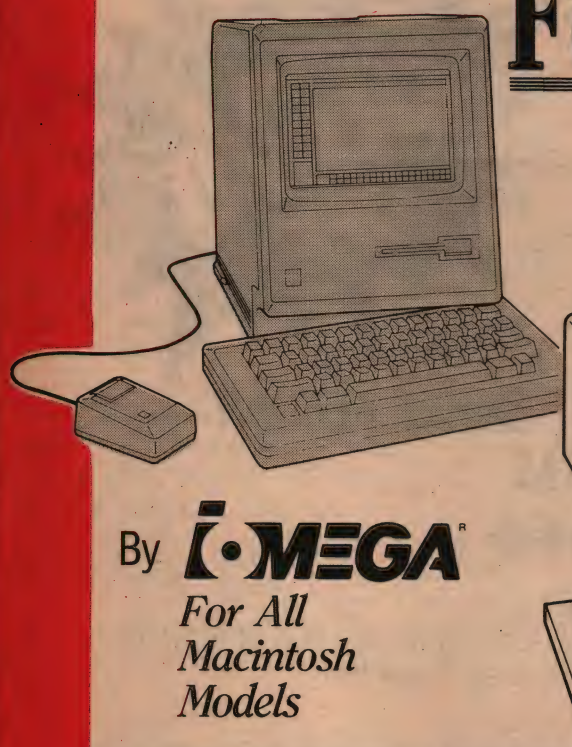
BCE LIQUIDATION!

For Macintosh

THE BERNOULLI BOX™



65% OFF LIST

Mfr. Retail ~~$1995.00~~

Liquidation Price

$699

By IOMEGA®

For All Macintosh Models

Model B105-MAC

For a little more than the cost of a floppy drive, you can get the **most versatile, most reliable** mass storage device on the market—

The Bernoulli Box!

- 5 MB of Storage Per Cartridge
- More Resistant to Shock and Vibration Than Any Other Storage System, Fixed or Removable
- Use For Primary Storage, Backup Storage, Archival Storage or Software Loading
- Works With All Macintosh Models *(Interfaces for Mac Plus and Enhanced Mac Also Available—Call For Details!)*
- Plugs Directly Into The Macintosh Serial Port *(Printer Can Plug Into Bernoulli Box)*

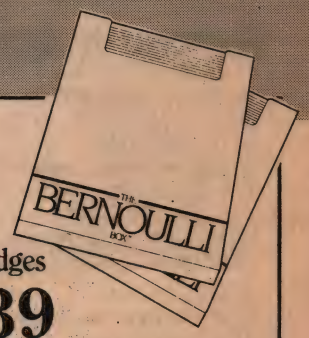
Specifications

Start/Stop Time: 5/10 seconds
Average Access Time: 50 ms
Capacity: 5 MB per cartridge
Size: 5.1″(H) x 10.7″(W) x 12.5″(D)

100% Satisfaction Guarantee

Full 90 day manufacturer's warranty from IOMEGA plus 15 day trial. If you are not satisfied with this product for any reason, simply call to return it within 15 days of receipt for a full refund.

SPECIAL OFFER!



Extra Cartridges

Only $39

Now you can get genuine Iomega Macintosh Bernoulli Box cartridges for only $39! See the "Ordering Information" chart below for details!

Ordering Information

Product #	Item	Price	Shipping
BB105-C8	The Bernoulli Box For Macintosh	$699	$19
BB740-C8	Bernoulli Box Cartridge	$ 39	$ 3

Order Toll Free

1-800-545-7447

Or Send Check Or Money Order To

BCE Authorized Liquidators
3233 K Street, NW
Department C8
Washington, DC 20007

Quantity Discounts Available

Ordering Information

Please specify Product Number when ordering. We ship UPS Ground anywhere in the continental USA. Allow three weeks shipping time. To return an item, call customer service (1-800-231-3549) for an authorization number. Quantities of all items are limited. Order Now!

VISA Order Toll Free MasterCard

1-800-545-7447

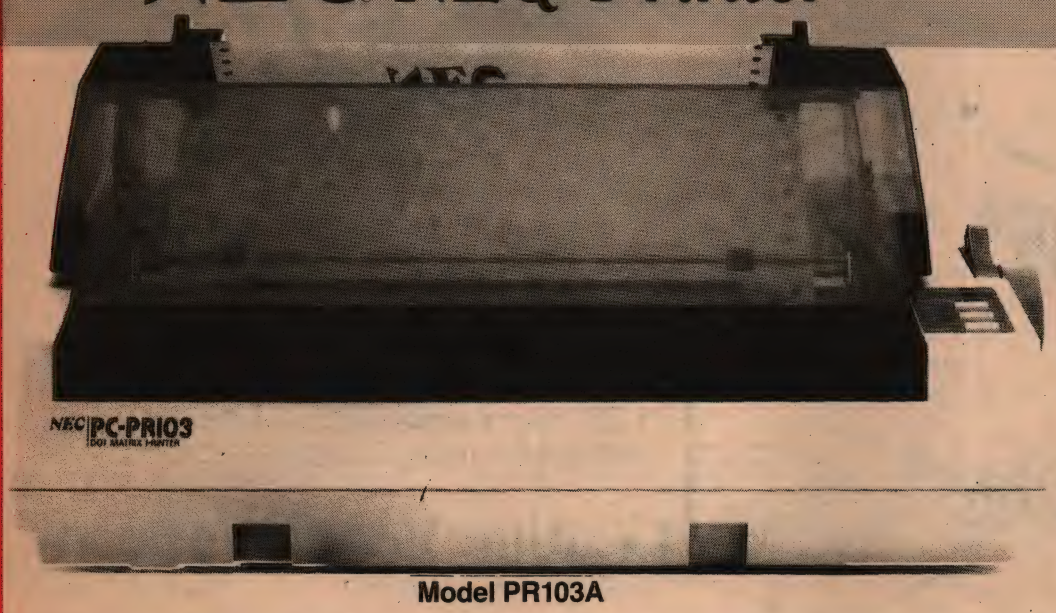
Product Information:
1-202-944-3900, 9-5 EST, M-F

Customer Service Inquiries:
1-800-231-3549, 9-5 EST, M-F

LIQUIDATION! BCE

Printer Liquidation!

NEC NLQ Printer



Model PR103A

70% OFF LIST

Mfr. Retail
~~$499.00~~

Liquidation Price
$149

- 110 CPS Draft, 40 CPS NLQ
- Parallel Interface
- Tractorfeed Included

Specifications

Printing Method Impact Dot Matrix
Print Head Impact Line Dot Type 16 Pins
Print Speed High Speed Pica: 92 cps; High Density Pica: 46 cps; Elite: 110 cps; Condensed: 78 cps
Printing High Speed Pica: 10 characters per inch; High Density Pica: 10 characters per inch; Elite: 12 characters per inch; Condensed: 17.1 characters per inch
Characters per Line High Speed Pica: 80; High Density Pica: 80; Elite: 96; Condensed: 137
Dot Composition High Speed Pica: 7x9; High Density Pica: 13x9; Elite: 7x7; Condensed: 7x9
Buffer Size 4K "Bit Image" type
Paper Feed Method Tractor or Friction Feed
Paper Types Cut Paper, Single Sheet, or Fanfold
Paper Width Cut—up to 10 inches; Fanfold—up to 10 inches
Paper Thickness Up to 0.10mm
Number of Copies One original plus two copies
Ink Ribbon Cartridge Type PC—PR103A-01; Color—Black; Life—1 million characters
Compatibility NEC 8023A—Same as Apple Graphics Printer and C.Itoh Proprinter *(Not fully graphics compatible)*
Interface Centronics, 8 bit parallel; works with IBM, Apple, Kaypro, etc.
Dimensions 13¾"(w) x 5½"(h) x 10"(d)
Weight 15.2 lbs.

Print Sample

```
This is an example of the Near Letter
Quality Print of the NEC PR103A.  It is
certainly the best of any printer in
this price range.  The type below is the
output of the automatic self-test.  It
will also print the character sets of
Germany, Japan, Sweden and the United
Kingdom.
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
 ▁▂▃▄▅▆▇ ▔▏▎▍▌▋▊▉ ▕▐ ▖▗▘▙▚▛▜▝▞▟ ¢£¥§¨©ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞßàáâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ
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100% Satisfaction Guarantee

Full 90 day warranty from NEC plus 15 day trial. If you are not completely satisfied with this printer for any reason, simply call within 15 days of receipt to return it for a complete refund.

Ordering Information

Product #	Item	Price	Shipping
NC700-C8	NEC PR103A Printer	$149	$15
CA200-C8	IBM Parallel Cable	$ 19	FREE SHIPPING WITH PRINTER ORDER
CA250-C8	Centronics to Centronics Parallel Cable	$ 19	

Order Toll Free
1-800-545-7447

Or Send Check or Money Order To

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3233 K Street, NW
Department C8
Washington, DC 20007

Quantity Discounts Available

Ordering Information

Please specify Product Number when ordering. We ship UPS Ground anywhere in the continental USA. Allow three weeks shipping time. To return an item, call customer service (1-800-231-3549) for an authorization number. Quantities of all items are limited. Order Now!

VISA Order Toll Free MasterCard
1-800-545-7447

Product Information:
1-202-944-3900, 9-5 EST, M-F

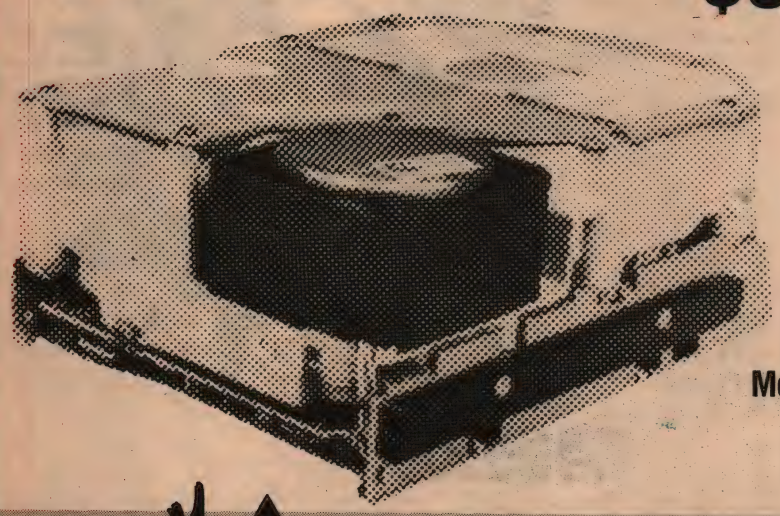
Customer Service Inquiries:
1-800-231-3549, 9-5 EST, M-F

LEADING EDGE® BCE

30 MB AT Hard Drive

Comp. Price $995.00

ONLY $349



Model 6640

- Full Height Fixed Drive with IBM Rails, IBM Shock Mounts, IBM Full Height Bezels & Cables
- 39 MSec Average Access Time
- 30 MB Formatted Capacity

FROM Leading Edge®

LEADING EDGE

Leading Edge® Warranty

100% Satisfaction Guarantee

Full 6 month factory warranty from Leading Edge, plus 15 day guarantee from BCE. If you are not completely satisfied with this drive for any reason, simply call within 15 days of receipt for a complete refund.

Why Such A Bargain?

These are high quality, fully guaranteed AT compatible disk drives. They come with a full warranty from Leading Edge, as well as their free customer service facilities.

How can we sell them so inexpensively? The answer is simple. You can benefit from a major marketing problem that the manufacturer had with a different drive. The manufacturer, CMI, made the 20 meg drives for the early IBM AT's. There were many problems with that particular drive when used with the IBM controller card and DOS 3.0. These problems led CMI to acquire a bad reputation for their 20 meg drives which, unfortunately, carried over to their trouble free 30 meg drives.

Because of the bad reputation of the 20 meg drives, Leading Edge was able to acquire the trouble free 30 meg drives at a great price and we're able to pass along the savings to you.

These drives are totally different from the 20 meg drives that were used in the early AT's. They have vastly improved hardware and firmware for positioning and tracking of the drive head as well as improved shielding around the drive itself. Each drive is individually tested before being shipped. They have a mean time between failures of 12,000 power-on hours.

In addition we give your our own 15 day 100% satisfaction guarantee. If you are not 100% satisfied, simply return it for a complete refund. What could be more fair?

When ordering, please specify **Product #LD200-C8. Add $12 shipping and insurance per drive.**

Quantity Discounts Available

Call Toll Free to Charge

1-800-545-7447

Or Send Check Or Money Order To

BCE

Department C8
3233 K Street, NW
Washington, DC 20007

Ordering Information

Please specify Product Number when ordering. We ship UPS Ground anywhere in the continental USA. Allow three weeks shipping time. To return an item, call customer service (1-800-231-3549) for an authorization number. Quantities of all items are limited. Order Now!

VISA Order Toll Free MasterCard

1-800-545-7447

Product Information:
1-202-944-3900, 9-5 EST. M-F

Customer Service Inquiries:
1-800-231-3549, 9-5 EST. M-F

LATEST AND GREATEST PRINTER

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PRICE GUARANTEE
We at MidWest Micro guarantee that we can save you up to 69% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

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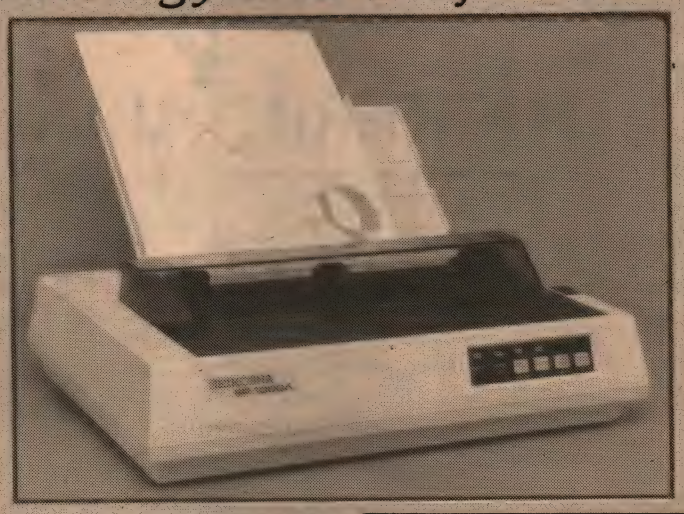
Get Advanced Technology and Craftsmanship with. . .

SEIKOSHA SP-1000 PRINTER



2 YEAR FACTORY WARRANTY

Low As $199

SUGGESTED LIST $349.

PRINTOUT SAMPLE

```
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
EFGHIJKL
789:;<=>?@ABCD EFGHIJKLMNOPQ
```

In order to keep your loyalty we at MidWest Micro are always looking for more printer and less price. In that search we've found for you a real gem in the price/performance arena. The Seikosha SP-1000 is made with the same precision and durability you have come to expect from the quality leader in the watch industry – Seiko.

The SP-1000 is completely full featured with the latest advances incorporated. It provides excellent near letter quality printing with a dense 24 by 18 dot density. This equates to 41,472 addressable dots per inch and gives superb "typewriter like" printing. Other printers with resolution this high cost hundreds of dollars more.

With the SP-1000 your computer can print 40, 48, 68, 80 or 136 characters per line. It can print 35 separate character styles including 13 double width and 3 reversed styles. You get Pica, Elite, Condensed and Italics – plus true superscripts and subscripts. All this can be done automatically, through easy commands right from your keyboard.

You get all these great features plus much, much more with the SP-1000 and there is a model made to fit your application. (This saves further in interfacing costs and problems). So call today to order or ask for a free brochure and print sample.

Character Font			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (Character/Inch)	Print Speed (Character/Second)
Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column	—	600 dot column
	Double Density Graphic		nx8	960 dot column		490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column		600 dot column
	Quadruple Density Graphic		nx8	*1920 dot column	—	*980 dot column
	640 Dot Graphic		nx8	640 dot column	—	326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot column
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

*Indicates that the specified figure includes half dots.

SP-1000 Series

	Your Price
• **SP-1000A,** Centronics parallel	$219
• **SP-1000AS,** RS-232 serial version	229
• **SP-1000 I,** IBM® PC compatible	229
• **SP-1000VC,** Commodore® C-64/C-128™ compatible	199
• **SP-1000AP,** Apple® IIC/Macintosh™ compatible	239

Features

- Impact dot matrix method, bi-directional in logic seeking, undirectional in graphic printing.
- 100 (Draft mode), 20 cps (Near Letter Qaulity) print speed, with reduced noise level.
- Pin-feed or friction-feed available.
- Automatic paper loading function.
- Paper empty detection.
- Input data dump in hexadecimal.
- Right, left margin set function.
- Self test printing.
- A variety of functions including Underline, Bold print, Double striking.
- A variety of print character sets including, Pica, Elite, Proportional, Elongated, Condensed, Italics, Super/Subscripts, and Italic Super/Subscripts.
- Automatic printing.
- Optional intelligent serial interface (#SP-80010)
- Downloadable Characters.
- Standard 1.5K buffer.

Please send me a 20 page PREFERRED CUSTOMER CATALOG. I am enclosing $1.00 and understand that a coupon for $2.00 off my purchase is enclosed in this special catalog.

Name _____

Address _____

City _____ State _____ Zip _____

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OHIO DEALERS CALL (800) 222-6571
HOTLINE: 513-663-4992 (For Technical Assistance or Information on Your Order)

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We at MidWest Micro guarantee that we can save you up to 69% or more on your purchase of new fully warranteed equipment and supplies. And we will still give you friendly, courteous service. Call today and Save With Confidence!

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Comuter Builders,

Why not let MidWest Micro help you save on quality components? We offer carefully built and tested boards complete with user manuals to take the problems out of your work. We support you with a total solutions whether you are assembling one or one thousand IBM' compatibles. With MidWest Micro and Dr. Zucker on your side you can win in the constant effort to get quality products at the most competitive prices.

So please call us today and begin to "Save with Confidence" on computer board products.

Sincerely

Mark Runkle
President
MidWest Micro

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It's another ZUCKERBOARD

Just open the box and your ZUCKERBOARD is ready to use. All Zuckerboards are MADE IN THE U.S.A. But they cost less because they use custom large-scale integrated circuits. Every one has been designed by the good Doctor himself and is of the highest quality money can buy. And you get a TWO-YEAR Warranty. Just what the Doctor ordered!

TANDY 1000 RAM CARD

- Full Tandy 1000 compatibility
- Brings System to full 640K
- DMA Controller on board
- Low power consumption
- Optional Clock/Calendar with 20-year battery

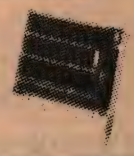
With 256K only LIST $109
Add Clock/Calendar LIST $39

With 512K RAM
LIST PRICE $149

576 RAM HALF CARD

$79

Without memory LIST PRICE $119



- Full IBM PC, XT compatibility
- Brings System up to 640K
- Uses 64K and/or 256K DRAM
- Low power consumption
- Optional Clock/Calendar Add $40 with 20-year battery

384K Half Card	$159
512K Half Card	189
576K Half Card	209
Add Clock/Calendar	239

MONOCHROME GRAPHICS CARD

Only **$99**

With Parallel Port LIST PRICE $379

- Full IBM PC, XT, AT compatibility
- TTL monochrome output
- 720 x 348 pixel graphics
- Hercules monographics compatible
- Parallel printer port
- 64K video RAM built-in
- IBM and Lotus 1.2.3 compatible

Monochrome Text-only
$119
LIST $229

COLOR GRAPHICS HALF CARD

$99 With Parallel Port
LIST PRICE $229

- Full IBM PC, XT, AT compatibility
- 640x200 mono; 320x200 color pixels
- Hercules Color Card compatible
- Parallel printer port
- Light pen interface
- Low power consumption
- FCC Certification

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-SEAGATE
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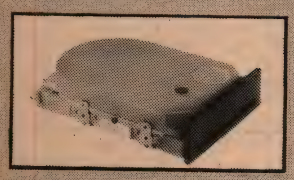

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- Formatted
- Tested
- Includes Mounting Hardware
- Auto Boot
- Includes Western Digital Controller

- 20 MEG Half Height **Kit** ..... **$419** each
- 20 MEG Full Height AT, 39 Mil ..... **599** each
- 30 MEG Half Height **Kit** ..... **659** each
- 40 MEG Full Height AT, 29 Mil ..... **899** each
- 60 MEG IBM PC/XT, 37 Mil, **Kit** ..... **$1099** each
- 5¼" - 10 MEG Removable Cartridge Drive Half Height, Cartridge Included ..... **539** each

HARD CARD

$689

- 20 MEG
- Low Power
- 5 Yr. Component Life
- Plated Media
- UL Listed
- 1 to 1 Interleave
- 1 Yr. Parts: Labor Warranty
- PC/XT Leading Edge/ Compaq/AT&T/Zenith/Compatibles

CONTROLLERS

Western Digital	$129
Floppy Controller	49

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- 5¼" Direct Drive ..... **$85** QTY+
- 5¼" Mitsubishi Direct Drive **105**

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- 25 MEG External PC/XT Port in EPCII Connects to Floppy Controller **$799**
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Phone (513) 663-5488

Fellow Computer Users,

Through special arrangements we have been authorized to offer you one of the most popular printers of all time at a "give away" price. Yes, we've sold thousands of the ever popular Gemini 10X printers at nearly twice the price. The 10X is a great choice for both business and home applications. Those already using our Star Gemini 10X's include about everyone from Bell Labs to my brother's kids.

I'm absolutely delighted to be able to offer you this durable and versatile printer for only $179. And you can expect the same friendly, courteous service both before and after the sale plus full warranty care from MidWest Micro.

Our supply is limited and they can't last long at this unbelievable price. So call today and get the buy of the year!

Sincerely
Mark L. Runkle
President
MidWest Micro

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NOW you can get the most printer for your dollar with. . .

Gemini 10X

NOW ONLY
$179
LIST **$399**

If you are looking for a top quality printer at an affordable price, you've found both in the Gemini 10X. The Gemini 10X operates bi-directionally at 120 cps. It switches from standard 80 column printing to 132 column condensed and 96 standard ASCII characters. This gives you the capabilities to do everything from recipes to spreadsheets. The character matrix offered includes the descenders, emphasized, double strike, block graphics and hi and low bit image graphics. These features give the Gemini 10X versatility enough for use in your home or office. The Gemini 10X also features a buffer expandable to 8K that lets you continue to work – not waste your time waiting on your printer. Breakdowns? Virtually unheard of with the Gemini 10X – with a print head life of over 100 million crisp, clean characters. The Gemini 10X comes complete with both friction and adjustable tractor feed. It even includes a free roll paper feed mechanism for greater economy.

Quantity Purchasing Buy 3+ @ $169 ea.
6+ @ $159 ea.
25+ *$CALL$*

Complete star **Gemini 10X PRINTER PACKAGE**
From MidWest Micro

Printer Package Includes:
1. Full Featured **star Gemini 10X Printer**
2. A **Universal Printer Stand** which tilts printer toward you for easy access and creates space for organizing paper
3. Attractive Heavy-Duty vinyl **Printer Cover** – anti-static and anti-dust
4. Plenty Pack of 20# bond clean-edge fanfold **Paper**
5. 2 Super length **Ribbons** for Gemini 10X
6. **Miniature Computer Clock** with 5 function quartz works and swivel monitor stand
7. Full **1 year Warranty** parts and labor
8. Free use of MidWest Micro's Customer **Support Hot Line** (513-663-4992)

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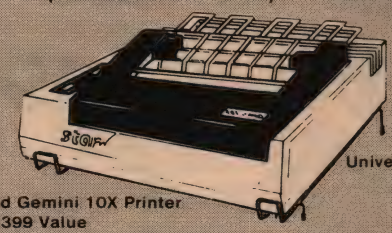
JUST **$219**
Save $314
(Limited Time Offer)



Ribbons $18 Value
Universal Printer Stand $49 Value
Full Featured Gemini 10X Printer $399 Value
Popular Miniature Computer Clock $19 Value
Heavy-duty Vinyl Cover $19 Value
Paper $29 Value

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Buy 1 @ $269
3+ @ $259
6+ @ $254
25+ $CALL$

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420 CPS COMREX CR-420 Business Printer MOVES MOUNTAINS

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Friends,

MidWest Micro has landed for you two of the best continuous duty, business quality printers anywhere. And the values absolutely cannot be beat! Through special arrangements we are able to offer a limited quantity of Comrex CR-4 daisywheel and CR-420 high speed dot matrix printers at unbelievable savings.

These printers are new in factory containers and come to you complete with manufacturers warranty.

Again this is a limited offer and will not be repeated. So call now and "Save with Confidence" to the tune of several hundreds of dollars.

We at MidWest Micro will continue to do our best for you. Thank you for your generous patronage.

Sincerely,

Mark L. Runkle
President

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City _____ State_____ Zip_____

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CR-420

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$895

LIST $2495

This stupendous brute of a printer will make short work of even your largest spreadsheets and reports. You will surprise yourself and amaze your friends and colleagues with this super printer performing in your office. Don't miss out on this one!

SPECIFICATIONS

Carriage Width: 132 Columns (at 10 pitch)

Print Method: Impact dot matrix, bidirectional, logic seeking in both text and graphics

Print Speed: 420 CPS/Draft; 104 CPS/Correspondence Quality; 2500 dots/sec – standard graphics; 1250 dots/sec – high-density graphics

Print Head: 8-pin, staggered arrangement

Character Sets: Standard 96 ASCII printing in 17 fonts

Line Spacing: n/180 (n=0-255)

Paper Feed: Pin feed (paper width adjustable) and built-in friction feed

Paper Width: 5" to 15" (pin feed); Up to 16" (feed)

Paper Path: Rear and bottom entry

Paper Thickness: Original plus 4 copies (5-part)

Ribbon: Cassette style, single color (black)

Interfaces: Parallel – Centronics-style; Serial –RS232C Asynchronous

Baud Rate: 1200, 2400, 4800, 9600; switch selectable

Protocols: X-ON/X-OFF, READY/BUSY, ETX/ACK, switch selectable

Buffer: 18K

Reliability: MTBF – 800 hours continuous printing; MCBF – 200 million characters; MTTR – 30 minutes

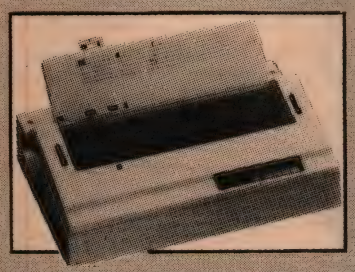
Power: 117 VAC ± 10%, or; 220 VAC ± 10%, 50/60 H_2

Power Consumption: 55W (Standby); 175W (Operating at self test print); 250W (Operating at heaviest duty)

Environmental Limits: Temperature (operating) 5°-40° C; 40°-105° F; Humidity (operating) 20-80%

Dimensions: 595mm (W) x 194mm (H) x 405mm (D); 23.4" (W) x 7.6" (H) x 15.9" (D)

Weight: 27kg; 60 lbs.



COMREX™

CR-4

Your Price Just

$399

Was $1995

- **Superior Performance**
- **Fast 36 CPS Print Speed**
- **7K Print Buffer**
- **Continuous Duty Cycle**
- **Wide 16-5" Paper Carriage**

This bidirectional, logic seeking marvel lets you adjust the hammer intensity to print anything from single-page letters to five-part forms with equal clarity. A variety of impressive typestyles give you added print versatility.

It is exceptional in many other ways. The 15½" wide carriage briskly prints all your ledgers, spreadsheets, and extra wide business graphics with ease. With the optional cut sheet feeder and tractor feeder, you can print several copies on your letterhead and switch to pin-fed paper for high volume word or data processing.

The 7K buffer holds a substantial amount of data while its printing.

The average life of the print wheel is 10 million characters. Which means that you can run it eight hours a day — every day of the week — for almost two full years. Of course, under more normal usage, it will handle your business correspondence and graphics for up to five full years without service. That's impressive.

Quiet quality.
What your eyes don't tell you, your ears will. Because this printer is much quieter than many more expensive printers. So you can keep the noise down while you keep the cost down.

Specifications

Print Speed	36 CPS (Shannon text)
Print Wheel	96 petals/wheel, cassette type, ASCII stand.
Print Wheel Life	10 million char./wheel
Characters/Line	132 characters (1/10"), 158 characters (1/2"), 198 characters (1/15")
Paper Width	16.5 in max (419 mm)
Copy Capacity	Original (45 kg) + 4 copies (15 kg) (total thickness 0.35 mm max.)
Carriage Motion	Bidirectional, logic seeking
Carriage Rtrn Speed	750 ms (at 13.2" return)
Line Spacing	6, 4, 3 lines/inch, 1/48" proportional increments
Paper Feed	Bidirectional, logic seeking
Paper Feed Speed	4"/second

Available Ribbons	Ribbon Life
Single-strike black carbon film	60,000
Multi-strike black carbon film	150,000
Single-strike black correctable film	70,000
Multi-strike black fabric	500,000
Single-strike red film	2,000
Correction tape	1,500

Interfaces	Centronics – Parallel RS-232C – Serial
Buffer Size	7K
Control Panel	Indicators: Select, Power, Alarm, Line, Pitch, and Copy (LEDs) Switches: Select, Line Feed, TOF, Line, Pitch, and Copy
Noise	Operating – Less than 65 dB
Temperature	50 to 105 F – 10 to 40 C (operating)
Humidity	20% to 80% non-condensing (operating) 5% to 90% non-condensing (storage)
Power	120 V, 60 Hz (Optional: 120 or 220 - 240 V, 50/60 Hz) 130 W Max.
Dimensions	21.18 (W) x 7.65 (H) x 15.15 (D) inches (538(W) x 194.5 (H) x 385 (D) mm)
Weight	33 lbs (15 kg)
Optional Features	Tractor feeder, Auto Cut Sheet Feeder, Single and Multi-strike ribbons, Interchangeable printwheels (Numerous languages and typestyles)

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OHIO DEALERS CALL (800) 222-6571

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CLOSED SATURDAY

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AVAILABILITY AND TYPE ERRORS

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All equipment shipped factory fresh with manufacturers warranty

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AUGUST SPECIAL ADVERTISING SECTION PAGE 1

SONY®

MAC • PAC

3½" SS Disks

$1.20 each Qty. 400
$1.25 each Qty. 100
$1.32 each Qty. 50

3½" DS Disks

$1.77 each Qty. 400
$1.85 each Qty. 100
$1.89 each Qty. 50

Boxed in tens	50+	100+
3½" SS	1.45	1.32
3½" DS	2.15	2.09
5¼" SS/DD	.89	.79
5¼" DS/DD	1.05	.99
5¼" HD	2.39	2.25

maxell

3½" SS DISKS
Packaged in fifties

$1.39 each Qty. 400
$1.42 each Qty. 100
$1.45 ea, Qty 50

MEMOREX

	100+
5¼" SS/DD	.73
5¼" DS/DD	.79

Nashua™

BOXED DISKS AS LOW AS 65¢
- Boxed in tens
- Write protect tabs and labels
- 100% certified

	50+	100+
3½" SS	1.35	1.29
3½" DS	1.89	1.84
5¼" SS/DD	.68	.65
5¼" DS/DD	.75	.69
5¼" HD	2.09	1.99

Packaged in poly-bags of 50, sold in increments of 250.
- Labels and write protects
- Envelopes

49¢ 500+ 5¼" SS/DD **51¢** 250+

59¢ 500+ 5¼" DS/DD **62¢** 250+

XIDEX NEW LOW PRICE

	100+
5¼" SS/DD	.52
5¼" DS/DD	.57

3M

	100+
5¼" SS/DD	1.05

We also carry a large inventory of 3M data cartridges and computer tape.

Verbatim DataLife

	100+
5¼" DS/DD	1.07

VERIFLEX

- Envelopes
- 100% error-free
- Labels and write protects

BULK
5¼" DS/DD Quantities of 100 **39¢** each

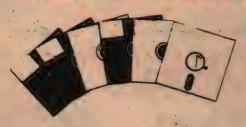
VERIFLEX

FREE CASE

- Packaged in tens in plastic library case
- 100% Certified
- Lifetime Warranty
- Tyvek envelopes

	50+	100+
5¼" SS/DD	.68¢	.65¢
5¼" DS/DD	.75¢	.69¢

MULTI—COLOR 10-PACKS



each 10-pack has:

1 Dark Blue	1 Yellow
1 Light Blue	1 maroon
1 Green	1 Gray
1 Red	1 Brown
1 Orange	1 Magenta

- Poly-bagged in tens
- 10 colored disks
- Tyvek envelopes
- Labels and write protects

	100+	400+
5¼" SS/DD	.69	.64
5¼" DS/DD	.75	.69

SOFTWARE CLOSEOUTS

WORDSTAR

Version 3.3	1+	$99.00
	10+	$89.00

BPS GRAPHICS

- Charts, graphs, overhead transparencies
- Professional looking graphics at a *fraction* of the cost!
- Extracts data directly from 123, Multiplan, Visicalc, dBase II, and more!

$29.99

Supplies limited!

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2 PAGE AUGUST SPECIAL ADVERTISING SECTION

SURGE SUPPRESSORS

Get the best possible protection for your investment:

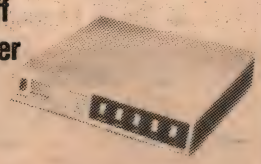
- Normal and common mode suppression
- Low let-through voltage
- Patented auto shut-off feature

6 Outlet $14.95

POWER CENTER

Get upfront, individual switching for up to five devices.

- Failsafe auto shut-off
- Built in circuit breaker
- Total compatability

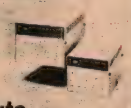


$49.95

POWER CONDITIONERS

Provides clean power to guard against:

- Loss of irreplaceable data
- Irreparable circuitry damage
- Erratic data displays and printouts
- Unwarranted shutdown of peripherals



RV 250, rated 250 VA $104.99
RV 550, rated 550 VA $232.99

PC PARTS

RS232 Serial Card	$38.99
RS232 Serial Card with Clock	$67.99
V-20 Chip	$14.95
512K RAM Card w/OK	$69.00
Floppy drive controller	$44.95
XT Type slide case	$59.00
180 Watt power supply	$99.00
AT Type keyboard	$89.00

intel MATH COPROCESSORS

8087-3 (PC/XT, 5 MHz or less)	$125.00
8087-2 (PC/XT, 8 MHz or less)	$150.00
80287 (PC-AT)	$195.00

64K 150NS	$1.05
256K 150NS	$3.25

COMPUTER TAPE

DESCRIPTION	3M BLACK WATCH 50+	DECADE 20 YEAR WARRANTY CERT. FOR USE AT 6250 BPI 10+	DECADE 20 YEAR WARRANTY CERT. FOR USE AT 6250 BPI 50+
3600' w/seal	19.75	17.95	16.95
2400' w/seal	12.95	11.50	10.95
2400' w/EZ11	13.50	11.95	11.50
1200' w/seal	10.30	8.85	7.95
600' w/seal	8.25	6.95	6.25
200' w/seal	FREE FREIGHT On orders of 50+ reels of Decade Tape	5.95	5.25
200' w/mailer		5.25	4.75

3M DATA CARTRIDGES

DC2000	$16.89
DC300A	$15.89
DC600HC	$23.69
DC1000	$13.39
DC615A	$15.89
DC100A	$11.89
DC300XL	$18.49
DC300XLP	$18.80
DC615HC	$17.29
DC600A	$20.85
NEW! DC600XTD	$35.99

NEW

DECADE II 20 Megabyte Cassettes for Genoa and Memtek tape back-up systems.

$14.95 *Quantity discounts available*

ROLLTOPS GENUINE TEAK

Get real wood for the price of most plastic files!

Holds 50 3½" disks $17.49
Holds 505¼" disks $24.99
Holds 100 5¼" disks $32.99

THE ORIGINAL ROLLTOP**

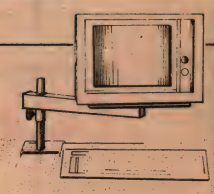
Classic design holds 50 3½" disks or 120 5¼", with dividers and labels.

3½" Model $17.49
5¼" Model $24.99

**Buff and oak finish

SPACESAVER 2 MONITOR ARM

Mounted adjustable arm for monitor
Retails for $89.00 **$69.99**



CRT & TERMINAL VALET

Wall, desk or flange mount
Retails for $99.95 **$88.00**

eldon® COPY HOLDER

Holds copy with see-through line guide
Retails for $19.08 **$11.98**

STACKABLE PRINTER STAND

Modular design saves space and improves efficiency
Retails for $29.98 **$19.99**

STACKABLE LETTER TRAY

For use with printer stand, in 8 colors
Retails for $7.98 **$6.99**

RSi TOTAL CARE SYSTEM

CONTAINS:
Swabs
Wipes
Head Cleaning Kit
Antistatic Spray
Screen Terminal Cleaner

For 3½" . . $12.95 For 5¼" $9.95

HEAD CLEANING KITS

For 3½" . . . . $7.95 For 5¼" $5.95

COPY II PC OPTION BOARD

By: Central Point Software

The best way to make archival backups of protected software!

- Add-in board
- Gives you same capabilities as most disk duplication firms
- Includes track editor
- Uses one full size slot

$89.00

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AUGUST SPECIAL ADVERTISING SECTION PAGE 3

RIBBONS

We stock a complete line of ribbons for printers and typewriters. If you don't see the exact ribbon you need on this page, call and one of our Flex Operators will gladly find it for you!

*Sold in lots of six

Printer	Price Each*
Anadex 9500/9600	5.19
Apple Imagewriter	2.99
Apple Imagewriter COLOR	3.05
CDC 9380	5.19
C. Itoh Prowriter	2.99
CDC HR-300	4.49
Centronics 101, 102/A	4.49
Centronics 350 Series	8.99
Centronics 704	5.19
Comrex 420	19.49
Data Products B-300	5.59
Data Products M-200	3.89
Diablo Hytype II	2.99
Digital Decwriter LA-30	2.39
Digital Decwriter LA-34	2.79
Digital Decwriter LA-180	3.59
Epson LQ1500	2.99
Epson MX80	2.45
Epson MX100	3.20
Hewlett Packard 2608	15.99
IBM 3262	5.99
IBM 3715 Silver Dollar	1.29
IBM 3776 Harmonica	3.49
IBM Proprinter	3.99
IBM 3784	3.49
IBM 5211 Double Donut	5.09
IBM 5224 Baseball Bat	17.49
IBM 5225	17.49
IBM 5242 Datamaster Handbag	2.59
Mannesman Tally MT-160	4.49
Mannesman Tally MT-180	4.69
NCR 2140 Answer cartridge	3.39
NEC Spinwriter	5.29
NEC 3500 Series Flip flop cartridge	12.99
NEC 8023	2.39
Okidata 182/192	4.90
Okidata 80/82/83/92	.99
Okidata 84/94	2.20
Panasonic KX-P1090 1091/1092	6.29
Printronix 300 New Style	5.49
Qume Sprint 9	2.99
Radio Shack DMP 2100	3.99
Ricoh Radio Shack II	2.79
Star Micronics Radix 10	4.49
Star Micronics Radix 15	5.49
Tally Honeywell	2.59
Toshiba 1350	4.59
Texas Instruments 850/855	4.50
Tritel Data Royal Qantel	2.59
Wang System 5	2.29

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4 PAGE AUGUST SPECIAL ADVERTISING SECTION

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SHORT CARD MODEM

- 100% Hayes compatible
- True short slot modem
- Easy to install ■ Five year warranty
- Made in the USA
- Single keystroke commands throughout, 18 number dialing table
- Auto dial to Dow Jones and The Source

1200/300 BPS **$139.00** With Quick Link Telecommunications Software

2400/1200/300 BPS **$329.00** With Quick Link Telecommunications Software

"desktalk" EXTERNAL MODEM
$139.00 1200 BPS FULLY HAYES COMPATIBLE

ZUCKERBOARD
COLOR GRAPHICS SHORT CARD

■ Parallel printer port ■ Two year warranty ■ Made in the USA

$89.00

BOTH HAVE PARALLEL PORT

MONO GRAPHICS CARD

- IBM and HERCULES Compatible
- Parallel printer port
- Two year warranty
- Made in the USA

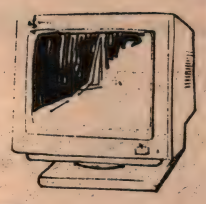
$99.00

MAGNAVOX MONITORS
MONOCHROME

- 12" monochrome TTL
- 22 MHZ amplifier bandwidth
- 1000 lines horizontal resolution
- 350 lines vertical resolution
- Built-in tilt stand

AMBER OR GREEN **$99.00**

SAMSUNG MONITORS



- 12" monochrome TTL
- High resolution
- Complete with tilt and swivel
- Amber monitor

$84.00 *Call for quantity discounts*

Seagate 20 MEG HARD DRIVE

Highest quality available.

- The only PC hard disk that comes complete with cables, controller, mounting hardware and full and ½ height bezels in one box.
- Fully tested and warranted for one year.
- Made in the USA.
- Controller and drive are fully tested together.

$429.00 10 to 20 MEG AVAILABLE *CALL!*

TEAC Drives $97.00

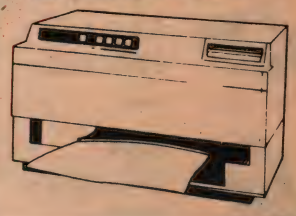
55F BV 360K Call for quantity discounts!

EGA Enhanced Graphics Card $349.00

- Supports 256K
- 1 Year Warranty
- Software switchable from IBM, EGA, mono and color
- Made in USA
- Parallel printer port

LASER PRINTERS
Canon

■ SUPER FAST ■ SUPER QUIET ■ SUPER SMALL



SUPER PRICE . . . **$1949.00**

HEWLETT PACKARD LASER JET

Parallel and Serial interface included **$2295.00**

LASERJET PLUS	$3995.00
LASERJET 500 PLUS	$4995.00
IDEAssociates 5251 Emulation Board with purchase of any HP LASERJET	$499.00

Font Cartridges From 7.5 to 16 point	$199.00 ea.
Toner Cartridges For Canon and Hewlett Packard	$89.49 ea.

Canon A-40 Printer

- Near letter quality printing
- high speed printing
- Three kinds of graphic image printing
- Quiet operation

$269.00 *Place your order today!*

MEMTEK 20 Meg Internal Tape Back-Up

We also carry DECADE brand data cassettes, $14.95 each

COMPACT . . . LOW COST

Includes software cables, controller card, drive and one data cassette.

$499.00

IBM compatibles at unbelievable prices!
See our ad on inside back cover!

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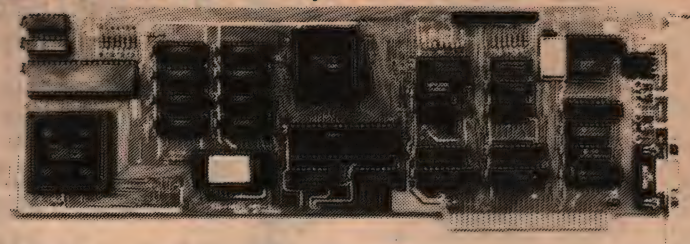
THE LATEST IN PC ENHANCEMENT PRODUCTS

ENHANCED GRAPHICS ADAPTOR $295.00

100% IBM COMPATIBLE—PASSES IBM EGA DIAGNOSTICS



- ★ COMPATIBLE WITH IBM EGA, COLOR GRAPHICS ADAPTOR AND MONOCHROME ADAPTOR
- ★ DISPLAYS 16 COLORS OUT OF 64 COLORS
- ★ COMES WITH 256K OF VIDEO RAM
- ★ DUAL SCANNING FREQUENCIES—WORKS WITH STANDARD OR EGA TYPE RGB MONITORS
- ★ LIGHT PEN INTERFACE

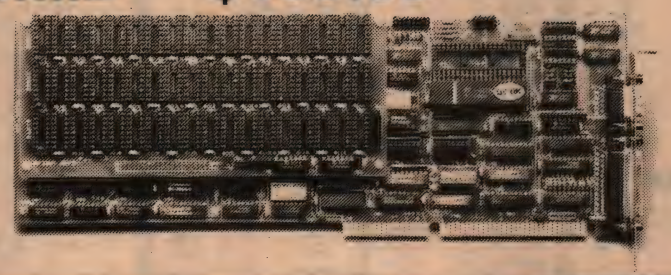
EXPANDED MEMORY CARD $199.95

UP TO 2 MEGABYTES OF LOTUS/INTEL COMPATIBLE MEMORY

- ★ CONFORMS TO LOTUS/INTEL EXPANDED MEMORY SPECIFICATIONS (EMS)
- ★ SHIPPED WITH ZERO K RAM, USER EXPANDABLE TO 2 MEGABYTES
- ★ USES 64K OR 256K DYNAMIC RAMS
- ★ USE AS EXTENDED (EMS) OR CONVENTIONAL MEMORY, RAMDISK OR SPOOLER
- ★ SOFTWARE INCLUDES EMS DEVICE DRIVERS, PRINT SPOOLER AND RAMDISK

AT MULTIFUNCTION CARD $199.95

ADDS UP TO 3 MEGABYTES OF USER EXPANDABLE MEMORY

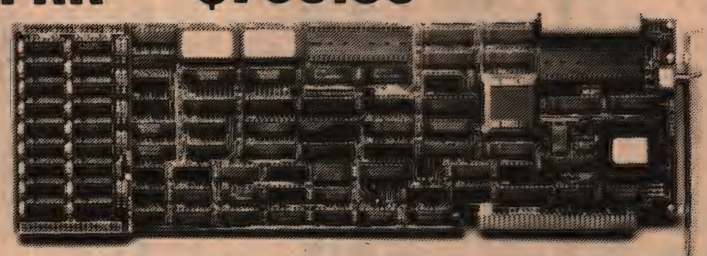


- ★ SHIPPED WITH ZERO K RAM, USER EXPANDABLE TO 1.5 MEGABYTES RAM ON BOARD, UP TO 3 MEGABYTES WITH OPTIONAL PIGGYBACK CARD
- ★ USES 64K OR 256K DYNAMIC RAMS
- ★ PARALLEL PORT & GAME PORT
- ★ SERIAL PORT
- ★ OPTIONAL SECOND SERIAL PORT

PIGGYBACK MEMORY CARD (NO MEMORY INSTALLED) **$49.95**

CLASSIC 286 SPEED PAK $795.00

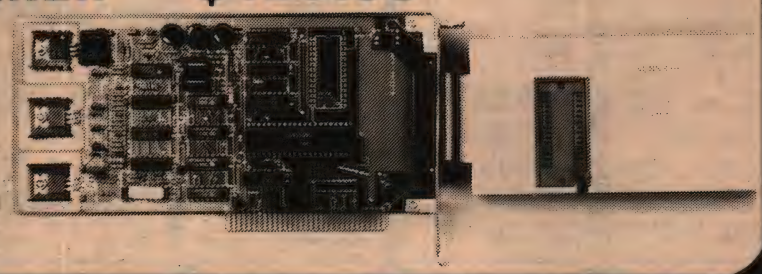
8 MHz 80286 ACCELERATOR BOARD FOR IBM PC/XT



- ★ 8MHz 80286 RUNS 33% FASTER THAN A STANDARD AT
- ★ RUNS AT PROGRAMS—COMPATIBLE WITH DOS 2.1, 3.0 & 3.1
- ★ COMPATIBLE WITH ALL PC/XT HARDWARE & SOFTWARE WITH NO PATCHES OR MODIFICATIONS NEEDED
- ★ 1 MEGABYTE MEMORY ON BOARD, EXPANDABLE TO 16MB
- ★ HIGH SPEED 16-BIT BIOS AND RAM
- ★ OPTIONS INCLUDE 80287 MATH CO-PROCESSOR, MULTITASKING SUPPORT AND MULTIUSER SUPPORT

EPROM PROGRAMMER $129.95

FOR IBM PC/XT/AT AND COMPATIBLES



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8212	1.49
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8237-5	5.49
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74LS09	.18	74LS192	.69
74LS10	.16	74LS193	.69
74LS11	.22	74LS194	.69
74LS12	.22	74LS195	.69
74LS13	.26	74LS196	.59
74LS14	.39	74LS197	.59
74LS15	.26	74LS221	.59
74LS20	.17	74LS240	.69
74LS21	.22	74LS241	.69
74LS22	.22	74LS242	.69
74LS27	.23	74LS243	.69
74LS28	.26	74LS244	.69
74LS30	.17	74LS245	.79
74LS32	.18	74LS251	.49
74LS33	.28	74LS253	.49
74LS37	.26	74LS256	1.79
74LS38	.26	74LS257	.39
74LS42	.39	74LS258	.49
74LS47	.59	74LS259	1.29
74LS48	.69	74LS260	.49
74LS51	.17	74LS266	.39
74LS73	.29	74LS273	.79
74LS74	.24	74LS279	.39
74LS75	.29	74LS280	1.98
74LS76	.29	74LS283	.59
74LS83	.49	74LS290	.89
74LS85	.49	74LS293	.89
74LS86	.22	74LS299	1.49
74LS90	.39	74LS322	3.95
74LS92	.49	74LS323	2.49
74LS93	.39	74LS364	1.95
74LS95	.49	74LS365	.39
74LS107	.34	74LS367	.39
74LS109	.36	74LS368	.39
74LS112	.29	74LS373	.79
74LS122	.45	74LS374	.79
74LS123	.49	74LS375	.95
74LS124	2.75	74LS377	.79
74LS125	.39	74LS378	1.18
74LS126	.39	74LS390	1.19
74LS132	.39	74LS393	.79
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74HC112	.79	74HC390	1.39
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74HCT11	.69	74HCT241	2.19
74HCT27	.69	74HCT244	2.19
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4051	.69	74C161	.99
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4056	2.19	74C192	1.49
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4093	.49	74C922	4.49
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7402	.19	74148	1.20
7404	.19	74150	1.35
7406	.29	74151	.55
7407	.29	74153	.55
7408	.24	74154	1.49
7410	.19	74155	.75
7411	.25	74157	.55
7414	.49	74159	1.65
7416	.25	74161	.69
7417	.25	74163	.69
7420	.19	74164	.85
7423	.29	74165	.85
7430	.19	74166	1.00
7432	.29	74175	.89
7438	.29	74177	.75
7442	.49	74178	1.15
7445	.69	74181	2.25
7447	.89	74182	.75
7470	.35	74184	2.00
7473	.34	74191	1.15
7474	.33	74192	.79
7475	.45	74194	.85
7476	.35	74196	.79
7483	.50	74197	.75
7485	.59	74199	1.35
7486	.35	74221	1.35
7489	2.15	74246	1.35
7490	.39	74247	1.25
7492	.50	74248	1.85
7493	.35	74249	1.95
7495	.55	74251	.75
7497	2.75	74265	1.35
74100	2.29	74273	1.95
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TL074	1.95	LM748	.59
TL081	.59	MC1330	1.69
TL082	.99	MC1350	1.19
TL084	1.49	MC1372	6.95
LM301	.34	LM1414	1.59
LM309K	1.25	LM1458	.49
LM311	.59	LM1488	.49
LM311H	.89	LM1489	.49
LM317K	3.49	LM1496	.85
LM317T	.95	LM1812	8.25
LM318	1.49	LM1889	1.95
LM319	1.25	ULN2003	.79
LM320	see7900	XR2206	3.75
LM322	1.65	XR2211	2.95
LM323K	4.79	XR2240	1.95
LM324	.49	MPQ2907	1.95
LM331	3.95	LM2917	1.95
LM334	1.19	CA3046	.89
LM335	1.40	CA3081	.99
LM336	1.75	CA3082	.99
LM337K	3.95	CA3086	.80
LM338K	3.95	CA3089	1.95
LM339	.59	CA3130E	.99
LM340	see7800	CA3146	1.29
LM350T	4.60	CA3160	1.19
LF353	.59	MC3470	1.95
LF356	.99	MC3480	8.95
LF357	.99	MC3487	2.95
LM358	.59	LM3900	.49
LM380	.89	LM3909	.98
LM383	1.95	LM3911	2.25
LM386	.89	LM3914	2.39
LM393	.45	MC4024	3.49
LM394H	4.60	MC4044	3.99
TL494	4.20	RC4136	1.25
TL497	3.25	RC4558	.69
NE555	.29	LM13600	1.49
NE556	.49	75107	1.49
NE558	1.29	75110	1.95
NE564	1.95	75150	1.95
LM565	.95	75154	1.95
LM566	1.49	75188	1.25
LM567	.79	75189	1.25
NE570	2.95	75451	.39
NE590	2.50	75452	.39
NE592	.98	75453	.39
LM710	.75	75477	1.29
LM723	.49	75492	.79

H=TO-5 CAN, K=TO-3, T=TO-220

IC SOCKETS

	1-99	100+
8 PIN ST	.11	.10
14 PIN ST	.11	.09
16 PIN ST	.12	.10
18 PIN ST	.15	.13
20 PIN ST	.18	.15
22 PIN ST	.15	.12
24 PIN ST	.20	.15
28 PIN ST	.22	.16
40 PIN ST	.30	.22
64 PIN ST	1.95	1.49
ST=SOLDERTAIL		
8 PIN WW	.59	.69
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80
WW=WIREWRAP		
16 PIN ZIF	4.95	CALL
24 PIN ZIF	5.95	CALL
28 PIN ZIF	6.95	CALL
40 PIN ZIF	9.95	CALL
ZIF=TEXTOOL		
(ZERO INSERTION FORCE)		

DATA ACQ INTERFACE

ADC0800	15.55	8T26	1.29
ADC0804	3.49	8T28	1.29
ADC0809	4.49	8T95	.89
ADC0816	14.95	8T96	.89
ADC0817	9.95	8T97	.59
ADC0831	8.95	8T98	.89
DAC0800	4.49	DM8131	2.95
DAC0806	1.95	DP8304	2.29
DAC0808	2.95	DS8833	2.25
DAC1020	8.25	DS8835	1.99
DAC1022	5.95	DS8836	.99
MC1408L8	2.95	DS8837	1.65

EDGECARD CONNECTORS

100	PIN ST	S-100	.125	3.95
100	PIN WW	S-100	.125	4.95
62	PIN ST	IBM PC	.100	1.95
50	PIN ST	APPLE	.100	2.95
44	PIN ST	STD	.156	1.95
44	PIN WW	STD	.156	4.95

36 PIN CENTRONICS

MALE

IDCEN36	RIBBON CABLE	6.95
CEN36	SOLDER CUP	4.95

FEMALE

IDCEN36/F	RIBBON CABLE	7.95
CEN36PC	RT ANGLE PC MOUNT	4.95

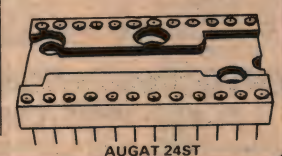
INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	4.95
ICM7207A	5.95
ICM7208	15.95

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE BELOW



DIODES/OPTO/TRANSISTORS

1N751	.25	4N26	.69
1N759	.25	4N27	.69
1N4148	25/1.00	4N28	.69
1N4004	10/1.00	4N33	.89
1N5402	.25	4N37	1.19
KBP04	.55	MCT-2	.59
KBU8A	.95	MCT-6	1.29
MDA990-2	.35	TIL-111	.99
N2222	.25	2N3906	.10
PN2222	.10	2N4401	.25
2N2905	.50	2N4402	.25
2N2907	.25	2N4403	.25
2N3055	.79	2N6045	1.75
2N3904	.10	TIP31	.49

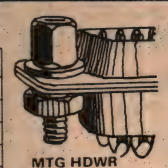
D-SUBMINIATURE

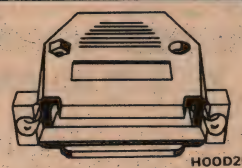
DESCRIPTION		ORDER BY	CONTACTS					
			9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.82	.90	1.25	1.25	1.80	3.48
	FEMALE	DBxxS	.95	1.15	1.50	1.50	2.35	4.32
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.20	1.49	---	1.95	2.65	---
	FEMALE	DBxxSR	1.25	1.55	---	2.00	2.79	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.70	2.95	---	3.98	5.70	---
	FEMALE	IDBxxS	2.92	3.20	---	4.33	6.76	---
HOODS	METAL	MHOODxx	1.25	1.25	1.30	1.30	---	---
	GREY	HOODxx	.65	.65	---	.65	.75	.95

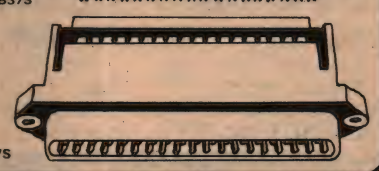
ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED.

EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

MOUNTING HARDWARE $1.00







LED DISPLAYS

FND-357(359)		COM CATHODE	.362"	1.25
FND-500(503)		COM CATHODE	.5"	1.49
FND-507(510)		COM ANODE	.5"	1.49
MAN-72		COM ANODE	.3"	.99
MAN-74		COM CATHODE	.3"	.99
MAN-8940		COM CATHODE	.8"	1.99
TIL-313		COM CATHODE	.3"	.45
HP5082-7760		COM CATHODE	.43"	1.29
TIL-311	4x7	HEX W/LOGIC	.270"	9.95
HP5082-7340	4x7	HEX W/LOGIC	.290"	7.95

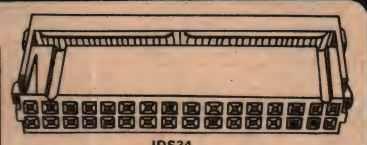
DIFFUSED LEDS

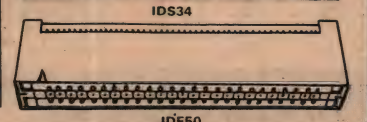
		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE ABOVE





SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
SPST	TOGGLE ON-OFF	.49
BCD OUTPUT 10 POSITION 6 PIN DIP		1.95

DIP SWITCHES

4 POSITION	.85	7 POSITION	.95
5 POSITION	.90	8 POSITION	.95
6 POSITION	.90	10 POSITION	1.29

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CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.30	2.75
16	.28	2.50	.48	4.40
20	.36	3.20	.60	5.50
25	.45	4.00	.75	6.85
26	.46	4.10	.78	7.15
34	.61	5.40	1.07	9.35
40	.72	6.40	1.20	11.00
50	.89	7.50	1.50	13.25

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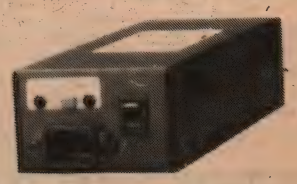

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10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	680	50V	.05
22	50V	.05	.001µf	50V	.05
27	50V	.05	.0022	50V	.05
33	50V	.05	.005	50V	.05
47	50V	.05	.01	50V	.07
68	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10
560	50V	.05	.1	50V	.12

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.047µf	50V	.15	.47µf	50V	.25

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1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	10	50V	.16
4.7	50V	.15	22	16V	.14
10	50V	.15	47	50V	.20
47	35V	.18	100	35V	.25
100	16V	.18	220	25V	.30
220	35V	.20	470	50V	.50
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WBU-204	5.13 x 8.45"	4	400	2	1260	3	24.95
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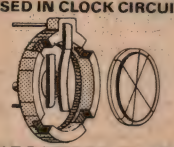

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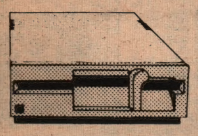

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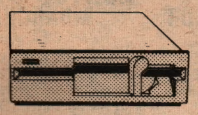
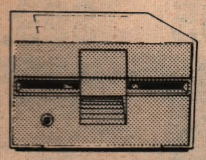
* SIX MONTH WARRANTY

BAL-500 $129.95



* TEAC MECHANISM-DIRECT DRIVE
* 100% APPLE COMPATIBLE
* FULL ONE YEAR WARRANTY

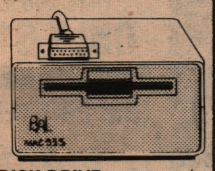
AP-135 $129.95



* FULL HT SHUGART MECHANISM
* DIRECT REPLACEMENT FOR APPLE DISK II
* SIX MONTH WARRANTY

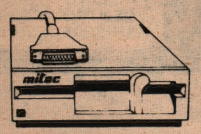
DOUBLE SIDED!

MAC535 $249.95



* 3.5" ADD-ON DISK DRIVE
* 100% MACINTOSH COMPATABLE
* DOUBLE SIDED 800K BYTE STORAGE
* HIGH RELIABILITY DRIVE HAS AUTO-EJECT MECHANISM
* FULL ONE YEAR WARRANTY

AD-3C $139.95



* 100% APPLE IIc COMPATIBLE, READY TO PLUG IN, W/SHIELDED CABLE & MOLDED 19 PIN CONNECTOR
* FAST, RELIABLE SLIMLINE DIRECT DRIVE
* SIX MONTH WARRANTY

DISK DRIVE ACCESSORIES

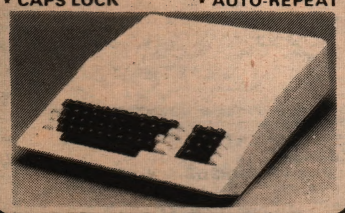
FDD CONTROLLER CARD	$49.95
IIc ADAPTOR CABLE	$19.95

ADAPTS STANDARD APPLE DRIVES FOR USE WITH APPLE IIc

KB-1000 $79.95

CASE WITH KEYBOARD FOR APPLE TYPE MOTHERBOARD

* USER DEFINED FUNCTION KEYS
* NUMERIC KEYPAD WITH CURSOR CONTROL
* CAPS LOCK
* AUTO-REPEAT



KEYBOARD-AP $49.95

* REPLACEMENT FOR APPLE II KEYBOARD
* CAPS LOCK KEY, AUTO-REPEAT
* ONE KEY ENTRY OF BASIC OR CP/M COMMANDS

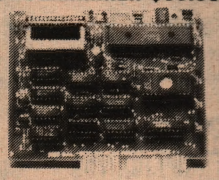
EXTENDER CARDS

IBM-PC	$45.00
IBM-AT	$68.00
APPLE II	$45.00
APPLE IIe	$45.00
MULTIBUS	$86.00

APPLE COMPATIBLE INTERFACE CARDS

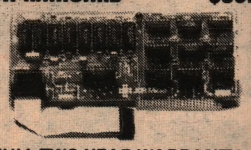
EPROM PROGRAMMER $59.95

MODEL RP525



* DUPLICATE OR BURN ANY STANDARD 27xx SERIES EPROM
* EASY TO USE MENU-DRIVEN SOFTWARE IS INCLUDED
* MENU SELECTION FOR 2716, 2732, 2732A, 2764 AND 27128
* HIGH SPEED WRITE ALGORITHM
* LED INDICATORS FOR ACTIVITY
* NO EXTERNAL POWER SUPPLY NEEDED
* ONE YEAR WARRANTY

16K RAMCARD $39.95



* FULL TWO YEAR WARRANTY
* EXPAND YOUR 48K APPLE TO 64K
* USE IN PLACE OF APPLE LANGUAGE CARD

BARE PC CARD W/INSTRUCTIONS $9.95

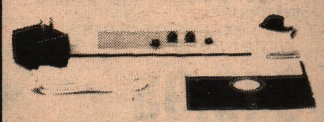
IC TEST CARD $99.95

* QUICKLY TESTS MANY COMMON ICs
* DISPLAYS PASS OR FAIL
* ONE YEAR WARRANTY
* TESTS: 4000 SERIES CMOS, 74HC SERIES CMOS, 7400, 74LS, 74L, 74H & 74S

300B MODEM $49.95

FOR APPLE OR IBM

INCLUDES ASCII PRO-EZ SOFTWARE



* FCC APPROVED
* BELL SYSTEMS 103 COMPATIBLE
* INCLUDES AC ADAPTOR
* AUTO-DIAL
* DIRECT CONNECT

CABLE FOR APPLE IIc $14.95

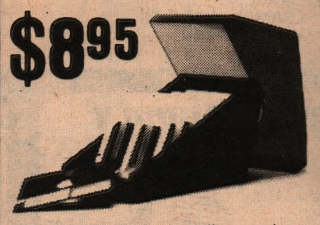
JOYSTICK CR-401 $7.95

FOR ATARI 400, 800, 2600, VIC 20/64 AND APPLE IIe

DISKFILE

HOLDS 70 5¼" DISKETTES

$8.95

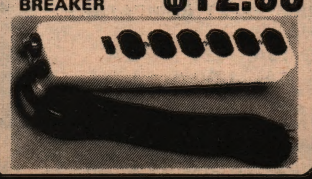


3.5" DISKFILE HOLDS 40 **$9.95**

POWER STRIP

* UL APPROVED
* 15A CIRCUIT BREAKER

$12.95



BAL 3-WAY SWITCH BOXES

* SERIAL OR PARALLEL
* CONNECTS 3 PRINTERS TO ONE COMPUTER OR VICE VERSA
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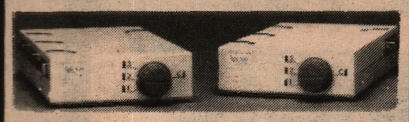
* HIGH QUALITY ROTARY SWITCH MOUNTED ON PCB
* GOLD CONTACTS
* STURDY METAL ENCLOSURE



SWITCH-3P CENTRONICS PARALLEL **$99.95**
SWITCH-3S RS232 SERIAL **$99.95**

BAL PRINTER BUFFERS

* FREES COMPUTER FOR OTHER TASKS WHILE PRINTING LONG DOCUMENTS
* STAND-ALONE DESIGN; WORKS WITH ANY COMPUTER OR PRINTER
* ALL MODELS FEATURE PRINT PAUSE MEMORY CHECK, GRAPHICS CAPABILITY

SP120P PARALLEL $139.95

* 64K UPGRADABLE TO 256K
* LED INDICATOR SHOWS VOLUME OF DATA IN BUFFER

SP120S RS232 SERIAL $159.95

* 64K UPGRADABLE TO 256K
* 6 SELECTBALE BAUD RATES, FROM 600B—19,200B

SP110P PARALLEL $249.95

* 64K UPGRADABLE TO 512K
* SPOOLS OUTPUT OF UP TO 3 COMPUTERS
* LED BARGRAPH DISPLAYS AMOUNT OF DATA IN BUFFER
* RESET FUNCTION CLEARS DATA IN BUFFER
* REPEAT FUNCTION CAN PRODUCE MULTIPLE COPIES OF A DOCUMENT

SP120 SP110

NASHUA DISKETTES DEALS

5¼" SOFT SECTOR
DS/DD WITH HUB RINGS

$9.90 BOX OF 10 **69¢ea** BULK QTY 50 **59¢ea** BULK QTY 250

NASHUA DISKETTES WERE JUDGED TO HAVE THE HIGHEST POLISH AND RECORDED AMPLITUDE OF ANY DISKETTES TESTED ACCORDING TO "COMPARING FLOPPY DISKS", BYTE 9/84

DISKETTES

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N-MD2F	DS/QUAD SOFT	$34.95
N-MD2H	DS/HD FOR AT	$49.95

NASHUA 8"

N-FD1	SS/DD SOFT	$27.95
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NASHUA 3.5"

N-3.5SS	3.5" SS/DD FOR MAC	$32.95

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V-MD1D	SS/DD SOFT	$23.95
V-MD2D	DS/DD SOFT	$29.95
V-MD110D	SS/DD 10 SECTOR HARD	$23.95

Sakata

120 CPS DOT MATRIX PRINTER

MODEL SP-1200 $169.95

* EPSON/IBM COMPATIBLE
* 9-WIRE PRINTHEAD
* 120 CPS-BIDIRECTIONAL, 80 COL.
* FRICTION AND TRACTOR FEED
* PROPORTIONAL SPACING
* CENTRONICS PARALLEL INTERFACE
* 8 CHARACTER SETS AND GRAPHICS

6 FOOT IBM PRINTER CABLE *$9.95*
REPLACEMENT RIBBON CARTRIDGE *$11.95*

5¼" FLOPPY DISK DRIVES

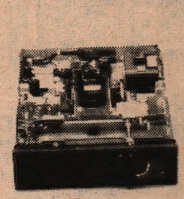
TEAC FD-55B	½ HT DS/DD (FOR IBM)	$109.95
TEAC FD-55F	½ HT DS/QUAD (FOR IBM)	$124.95
TEAC FD-55GFV	½ HT DS/HD (FOR IBM AT)	$154.95
TANDON TM100-2	DS/DD (FOR IBM)	$129.95
TANDON TM50-2	½ HT DS/DD (FOR IBM)	$89.95
MPI-B52	DS/DD (FOR IBM)	$89.95
QUME QT-142	½ HT DS/DD (FOR IBM)	$79.95

8" FLOPPY DISK DRIVES

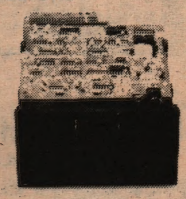
FD 100-8	SS/DD (SA/801 EQUIV)	$119.00
FD 200-8	DS/DD (SA/851R EQUIV)	$159.00

DISK DRIVE ACCESSORIES

TEAC SPECIFICATION MANUAL	$5.00
TEAC MAINTENANCE MANUAL	$25.00
½ HT MOUNTING HARDWARE	$2.95
MOUNTING RAILS FOR IBM AT	$4.95
"Y" POWER CABLE FOR 5¼" FDDs	$2.95
5¼" FDD POWER CONNECTORS	$1.19



TEAC FD-55



TANDON TM100-2

DISK DRIVE ENCLOSURES

CAB-APPLE $24.95
APPLE TYPE CABINET W/OUT POWER SUPPLY

CAB-1FH5 $69.95
FULL HT 5¼" BEIGE CABINET W/POWER SUPPLY

CAB-2SV5 $49.95
DUAL SLIMLINE 5¼" CABINET W/POWER SUPPLY

CAB-2SV8 VERTICAL **$209.95**
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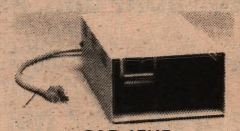
CAB-2FH8 HORIZINTAL **$219.95**
DUAL FULL HT 8" CABINET W/POWER SUPPLY

CAB-2SV5



CAB-1FH5

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AUTO RANGING, POLARITY AND DECIMAL!

* LARGE 3.5 DIGIT DISPLAY
* DATA HOLD SWITCH FREEZES READING
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* LOW BATTERY INDICATOR
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BUILD A COMPLETE 256K XT SYSTEM—$717

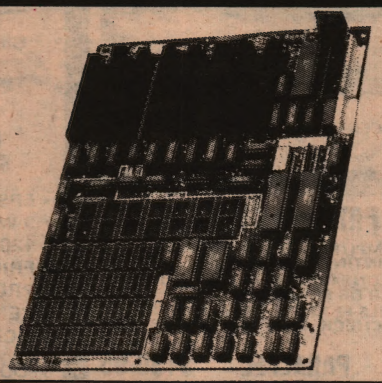
SEAGATE ST-225 20MB HARD DISK SYSTEM

INCLUDES HALF LENGTH HD CONTROLLER, CABLES, MOUNTING HARDWARE AND INSTRUCTIONS. ALL DRIVES ARE PRE-TESTED AND COME WITH A ONE YEAR WARRANTY.

$449.00

XT COMPATIBLE MOTHERBOARD

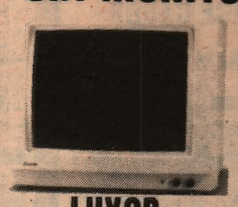
$159.95



- 4.77 MHz 8088 CPU, OPTIONAL 8087 CO-PROCESSOR
- 8 EXPANSION SLOTS
- 0K RAM INSTALLED, EXPANDABLE TO 640K ON-BOARD MEMORY
- ALL ICs SOCKETED-HIGHEST QUALITY PC BOARD
- ACCEPTS 2764 OR 27128 ROMS

PRO-BIOS $29.95

CRT MONITORS FOR ALL APPLICATIONS



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HI-RES RGB MONITOR
MODEL 190-9528

- DIGITAL RGB-IBM COMPATIBLE
- 14" SCREEN
- 16 TRUE COLORS
- 25 MHz BANDWIDTH
- RESOLUTION > 640 x 262
- .31mm DOT PITCH
- CABLE FOR IBM PC INCLUDED

$299.95

SAKATA
COMPOSITE COLOR
MODEL SC-100

- TOP RATED FOR APPLE
- 13" COMPOSITE VIDEO
- RESOLUTION: 280H x 300V
- INTERNAL AUDIO AMP
- ONE YEAR WARRANTY

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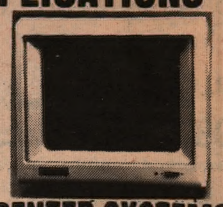

CENTER SYSTEMS
MONOCHROME
MODEL KLM-1211

- IBM COMPATIBLE TTL INPUT
- 12" NON-GLARE SCREEN
- P39 GREEN PHOSPHORUS
- VERY HIGH RESOLUTION: 25 MHz BANDWIDTH 1100 LINES (CENTER)

AMBER VERSION $109.95

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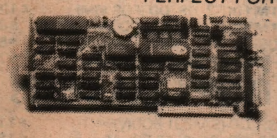
IBM COMPATIBLE INTERFACE CARDS

ALL WITH A ONE YEAR WARRANTY

MULTI I/O FLOPPY CARD — $129.95

PERFECT FOR THE 640K MOTHERBOARD



- 2 DRIVE FLOPPY DISK CONTROLLER
- 1 RS232 SERIAL PORT; OPTIONAL 2nd SERIAL PORT
- PARALLEL PRINTER PORT
- GAME PORT
- CLOCK/CALENDAR
- SOFTWARE: CLOCK UTILITIES, RAMDISK, SPOOLER

OPTIONAL SERIAL PORT $15.95

MULTIFUNCTION CARD — $119.95

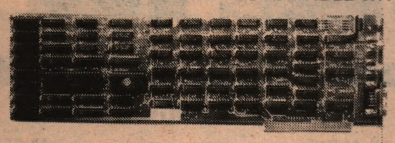
ALL THE FEATURES OF AST'S 6 PACK PLUS AT HALF THE PRICE

- CLOCK/CALENDAR
- 0-384K RAM
- SERIAL PORT
- PARALLEL PORT
- GAME PORT
- SOFTWARE INCLUDED

PRINTER CABLE $9.95
64K RAM UPGRADE 9/$10.71

COLOR GRAPHICS ADAPTOR — $99.95

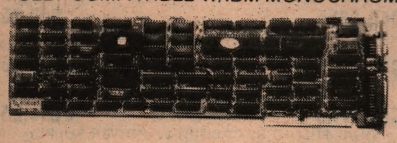
FULLY COMPATIBLE WITH IBM COLOR CARD



- 4 VIDEO INTERFACES: RGB, COMPOSITE COLOR, HI-RES COMPOSITE MONOCHROME, CONNECTOR FOR RF MODULATOR
- COLOR GRAPHICS MODE: 320 x 200
- MONO GRAPHICS MODE: 640 x 200
- LIGHT PEN INTERFACE

MONOCHROME GRAPHICS CARD — $119.95

FULLY COMPATIBLE W/IBM MONOCHROME ADAPTOR & HERCULES GRAPHICS



- LOTUS COMPATIBLE
- TEXT MODE: 80 x 25
- GRAPHICS MODE: 720 x 348
- PARALLEL PRINTER INTERFACE
- OPTIONAL SERIAL PORT $19.95

MONOCHROME ADAPTOR — $49.95

ANOTHER FANTASTIC VALUE FROM JDR!

- IBM COMPATIBLE TTL OUTPUT
- 720 x 350 PIXEL DIPLAY

PLEASE NOTE: THIS CARD WILL NOT RUN LOTUS GRAPHICS AND DOES NOT INCLUDE A PARALLEL PORT

FLOPPY DISK DRIVE ADAPTOR — $49.95

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- INCLUDES CABLE FOR TWO INTERNAL DRIVES
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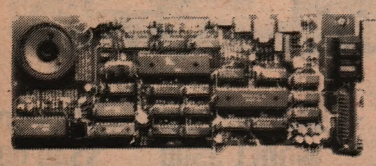
- RUNS QUAD DENSITY DRIVES WHEN USED WITH JFORMAT

EASYDATA 1200 BAUD MODEM FOR IBM

INCLUDES PC TALK III COMMUNICATIONS SOFTWARE



- NEW 10 INCH CARD
- HAYES COMPATIBLE
- AUTO DIAL/AUTO ANSWER
- AUTO RE-DIAL ON BUSY
- INCLUDES SERIAL PORT!
- ONE YEAR WARRANTY

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XT MOTHERBOARD	$159.95
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256K RAM	$26.55
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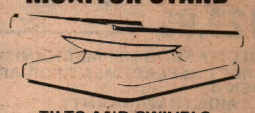
FLIP-TOP CASE	$49.95
DKM-2000 KEYBOARD	$79.95
½ HEIGHT QUME DRIVE	$79.95
FLOPPY DISK CONTROLLER	$49.95
MONOCHROME ADAPTOR	$49.95
MONOCHROME MONITOR	$99.95
TOTAL:	$716.10

MONITOR STAND



TILTS AND SWIVELS

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IBM PRINTER CABLE

- DB25 TO CENTRONICS
- SHIELDED CABLE

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IBM STYLE COMPUTER CASE

AN ATTRACTIVE STEEL CASE WITH A HINGED LID FITS THE POPULAR PC/XT COMPATIBLE MOTHERBOARDS

- SWITCH CUT-OUT ON SIDE FOR PC/XT STYLE POWER SUPPLY
- CUT-OUT FOR 8 EXPANSION SLOTS
- ALL HARDWARE INCLUDED

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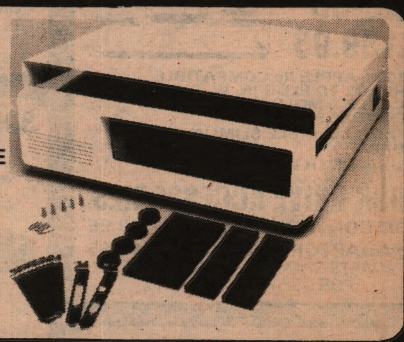
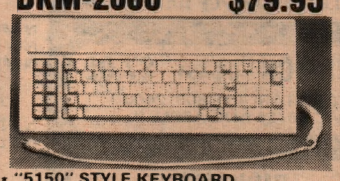


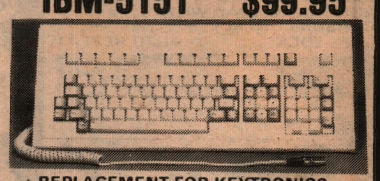
IBM COMPATIBLE KEYBOARDS

DKM-2000 $79.95



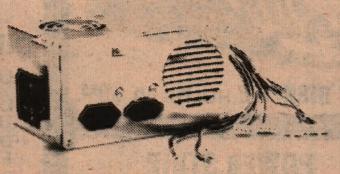
- "5150" STYLE KEYBOARD
- FULLY IBM COMPATIBLE
- LED STATUS INDICATORS FOR CAPS & NUMBER LOCK
- 83 KEY — SAME LAYOUT AS IBM PC/XT KEYBOARD

IBM-5151 $99.95



- REPLACEMENT FOR KEYTRONICS KB-5151™
- SEPARATE CURSOR & NUMERIC KEYPAD
- CAPS LOCK & NUMBER LOCK INDICATORS
- IMPROVED KEYBOARD LAYOUT

POWER SUPPLY



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- +5V @ 15A, +12V @ 4.2A -5V @ .5A, -12V @ .5A

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COMPATIBILITY: Includes GW BASIC and MS DOS
■ Uses standard software written for the IBM XT; Lotus 1 2 3, Wordstar, etc.
MEMORY: 640K on motherboard
CPU: Intel 8088 microprocessor ■ 4.77 MHz clock rate
POWER SUPPLY: 135 watt ■ Four power connectors for internal drives, one external for monitor
EXPANSION: Six long slots, two short ■ Expandable with up to four storage devices
DRIVES: Two half height 5¼" drives
PRINTER PORT: One parallel port, IBM XT compatible
VIDEO DISPLAY: High resolution amber or green monochrome monitor ■ Video board included
KEYBOARD: Fully IBM compatible AT style
MANUAL: Illustrated and bound in hard cover binder
WARRANTY: 90 days parts/labor ■ Extended service plan available through ITT Servcom.

AT STANDARD MODEL $1695.00

COMPATIBILITY: Includes GW BASIC and MS DOS
■ Uses standard software written for the IBM XT; Lotus 1 2 3, Wordstar, etc.
MEMORY: 640KB, expandable to 1 MB on motherboard
CPU: 80286 microprocessor, 8.0 MHz clock
POWER SUPPLY: 110/240 volts, 60/50 cycles, 200 watt
EXPANSION: Eight slots, three used in standard model
DRIVES: One double sided, high density 5¼" floppy drive with 1.2 MB storage
PRINTER PORT: One parallel port, IBM AT compatible
VIDEO DISPLAY: High resolution amber or green monochrome monitor
KEYBOARD: Fully IBM compatible AT style
MANUAL: Illustrated and bound in hard cover binder
WARRANTY: 90 days part/labor ■ Extended service plan available through ITT Servcom

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